

## STRUCTURE OF THE MICROCARD

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A02 = Special features/—1
test speci-
fications
A01 = Structure of
microcard —A— **XXX XX*XX XXXXX XX
B01 = 2 —B— *XXXX XXXXX XXXXX XXXXX XXXXX XXX
C— XXXXX XXXXX XXXXX XXXXX XXXXX XXX
D— XXXXX XXXXX XXXXX XXXXX XXXXX XXX
E— XXXXX XXXXX XXXXX XXXXX XXXXX XX
F—
G—
H—
J—
K—
L—
M—
N—
XX*
12345 67890 12345 67890 12345 678
1 2

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N28 = Table of contents and publication information

1 = Tools and devices

2 = Complete instructions, divided into test steps (no references)

a. Read from left to right.

b. Title of micropicture (appears on each coordinate).

E16	Product/component/test step	
	Coordinate	

### c. Limits of section

$\Rightarrow$	$\Leftarrow \Rightarrow$	$\Leftarrow$	$\Rightarrow \Leftarrow$
Beginning	Mid-section	End	One-page section

A01		
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## SPECIAL FEATURES

Microcard contains the repair and testing instructions with the respective test specifications for the alternators 0 120 689 ..  
T1 - 28V 110/180A

**Note:**

The alternator 0 120 689 519 has been taken as the basis for compiling these repair and testing instructions. The different versions of the alternators must be taken from the respective service-parts microcards.

The double T1 alternator is a new concept from the Bosch company and its first application has been in MAN buses starting in mid-1985.

The important special features of the alternator are:

\* Maintenance-free running period of 200 000 to 300 000 km

- \* Maintenance-free rolling bearings

- \* Improved protection against corrosion with air-intake cover

\* Suitable for emergency operation without battery

\* Operation with subsequent-damage preventer

The installation of a 100  $\Omega$  resistor between D+ and D- in the alternator makes it possible to detect an open circuit in the field, indicated by the alternator indicator lamp lighting up.

A02		
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TEST SPECIFICATIONS - ELECTRICAL

Damping resistor at terminal W 3,3 k Ω

Resistor for detection of field open  
circuit 100 Ω

Load current ≤ 10A

Regulator part number	Regul. voltage V
0 192 053 024	27.6...28.4

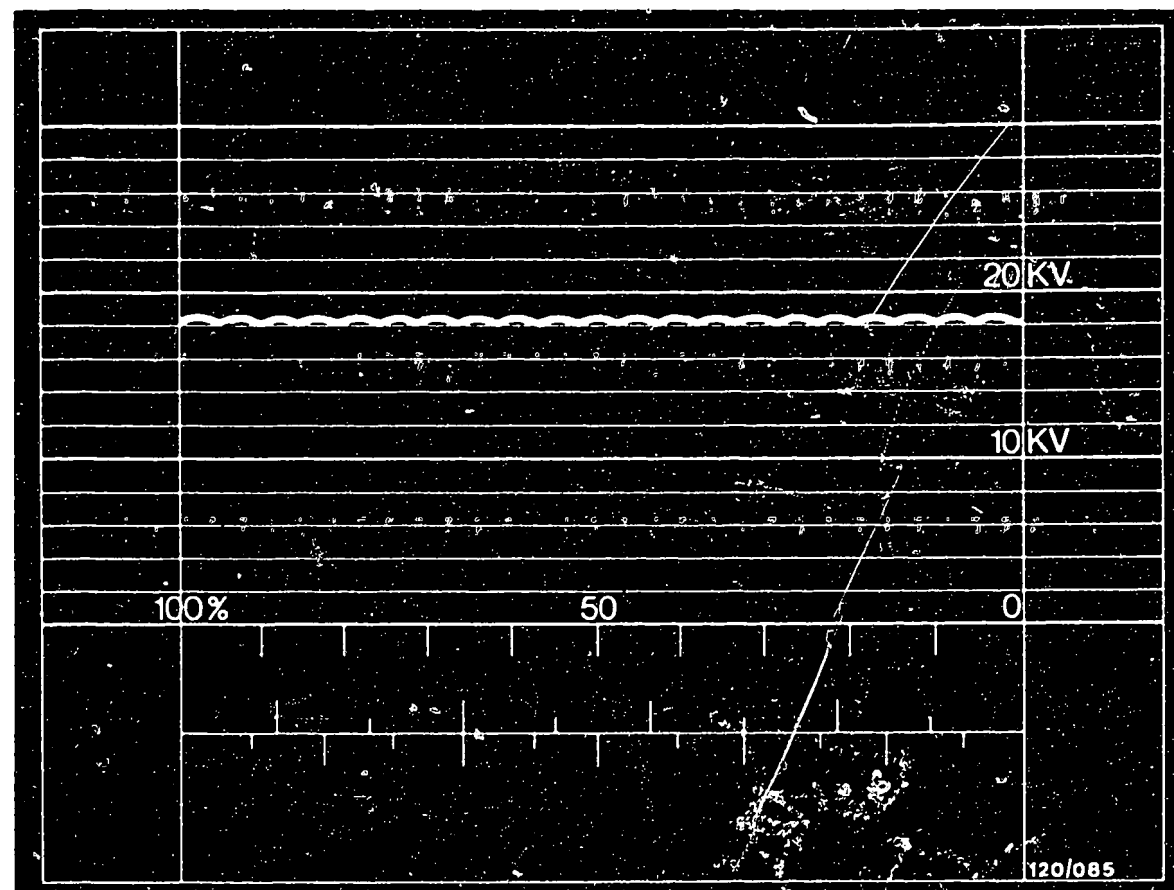
Power test + resistance values  
Stator / rotor

Test requirements:

- \* Testing the alternator with regulator  
Set regulated voltage of regulator to 26 V.
- \* Leave alternator running on the test bench at a speed of 1500 min<sup>-1</sup> for 30 minutes. Alternator must be at normal operating temperature for the test (approx. 60°C).

Alternators	Power test with regulator		Resistance values Ω +10%	
	min <sup>-1</sup>	(A)	Stator	Rotor
0 120 689 ...				
T1(<->) 28V 110/180A	< 880 1500 6000	5 118 >176	< 0.1	7.5

After completion of the test, run the alternator once at a speed of 7000 min<sup>-1</sup>. This is to test whether the alternator stands up to this mechanically.



Oscilloscope display O.K.:

If the alternator is O.K., the above oscilloscope pattern will be displayed. The DC output has a slight ripple.

The pattern can exhibit small peaks when the voltage regulator comes into operation. The regulator can be stopped by means of switching in loads (e.g. load resistor).

Adjust the pattern height so that the ripple is contained between two adjacent kV lines.

In order to be able to compare such patterns, the pattern concerned is to be adjusted with the vertical control of the oscilloscope so that it fits approximately between the 10 kV and 20 kV lines.

N o t e : More than one defect may be present at one time.

## TEST SPECIFICATIONS - MECHANICAL

One-sided air gap between rotor and stator  
> 0.3 mm

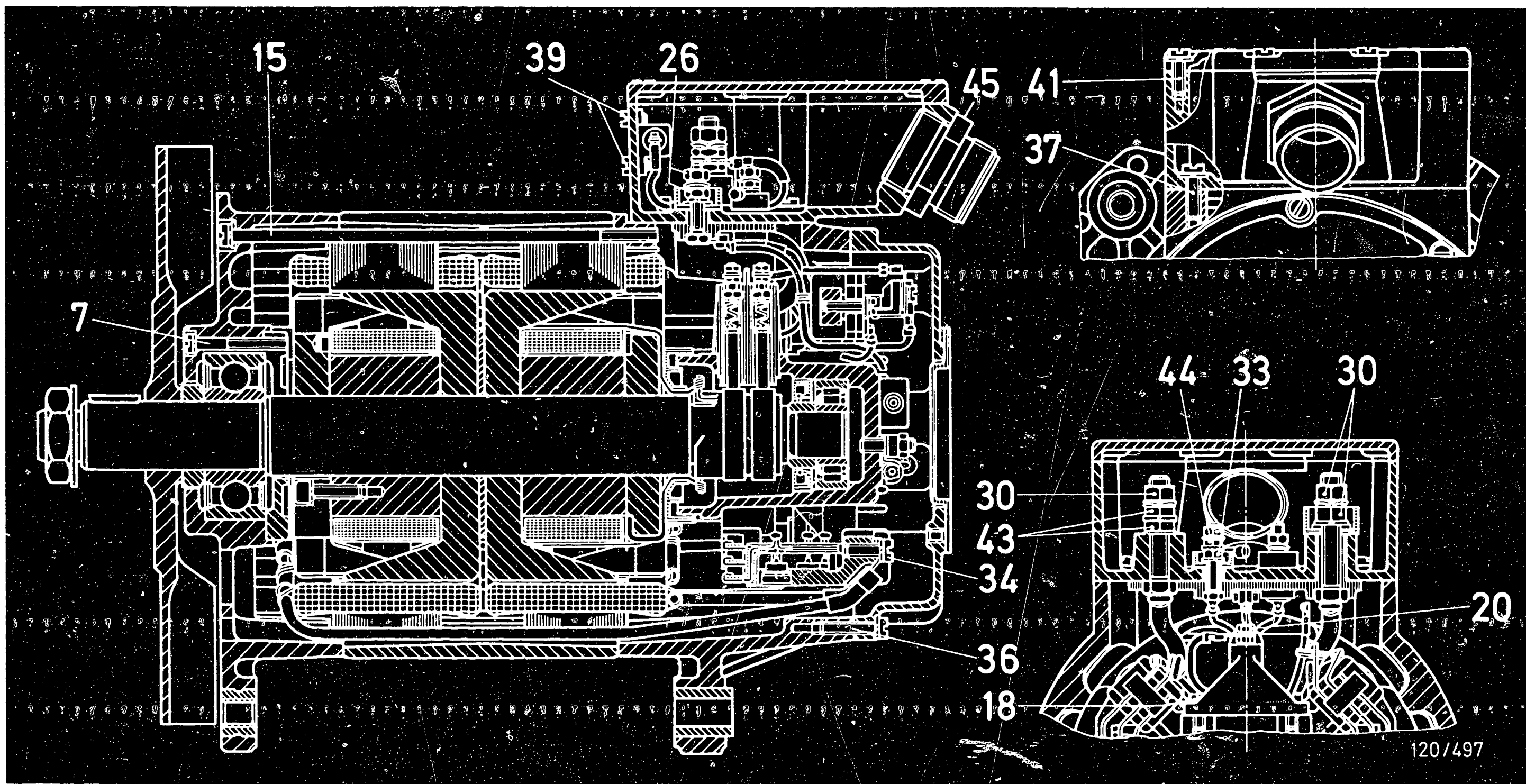
True-running error:  
Mounting of rotor at the journals.

Outer diameter of rotor 0.05 mm

Outer diameter of collector rings 0.03 mm

Minimum diameter of collector rings and  
projection of carbon brushes (see table).

Alternators	Collector-ring diameter (mm)		Projection of carbon brushes (mm)	
	new	min. diameter	new	min.
0 120 689 ...	39.7	37.7	18.5-22.0	7

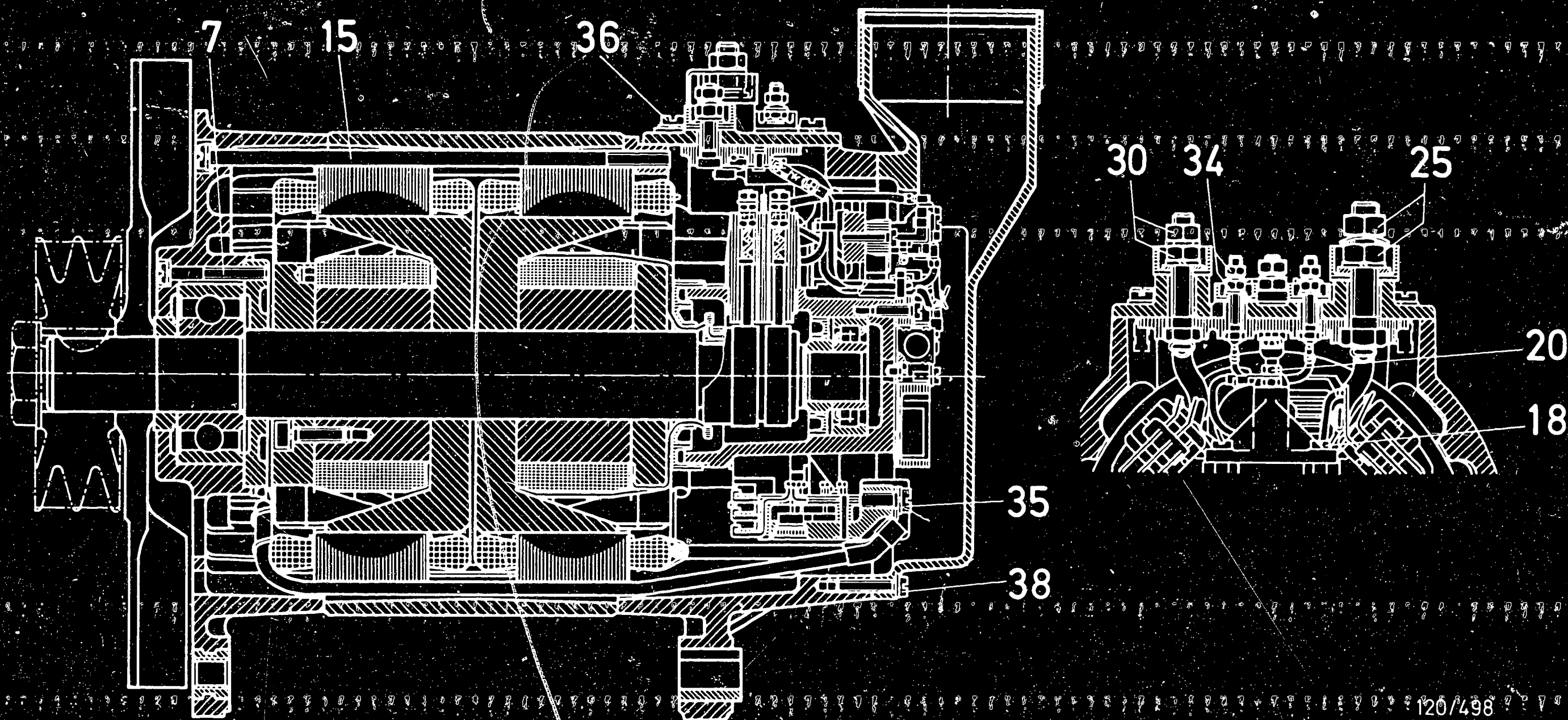


Tightening torques: Double T1 alternator 0 120 689 519

Items 20,39	= 1.0 ... 1.4 Nm
Item 44	= 2.2 ... 2.8 Nm
Items 18,33,36 lower nut	= 2.8 ... 3.6 Nm
Item 7	= 4.1 ... 5.5 Nm
Items 34,26 lower nut	= 4.9 ... 6.6 Nm
Items 15,37	= 7.2 ... 9.7 Nm

Item 30 lower nut, 43	= 10 ... 13 Nm
Item 33 upper nut, 41	= 0.9 ... 1.2 Nm
Item 26	= 1.4 ... 1.7 Nm
Item 30	= 3.2 ... 3.5 Nm
Item 45	= 70 ... 90 Nm

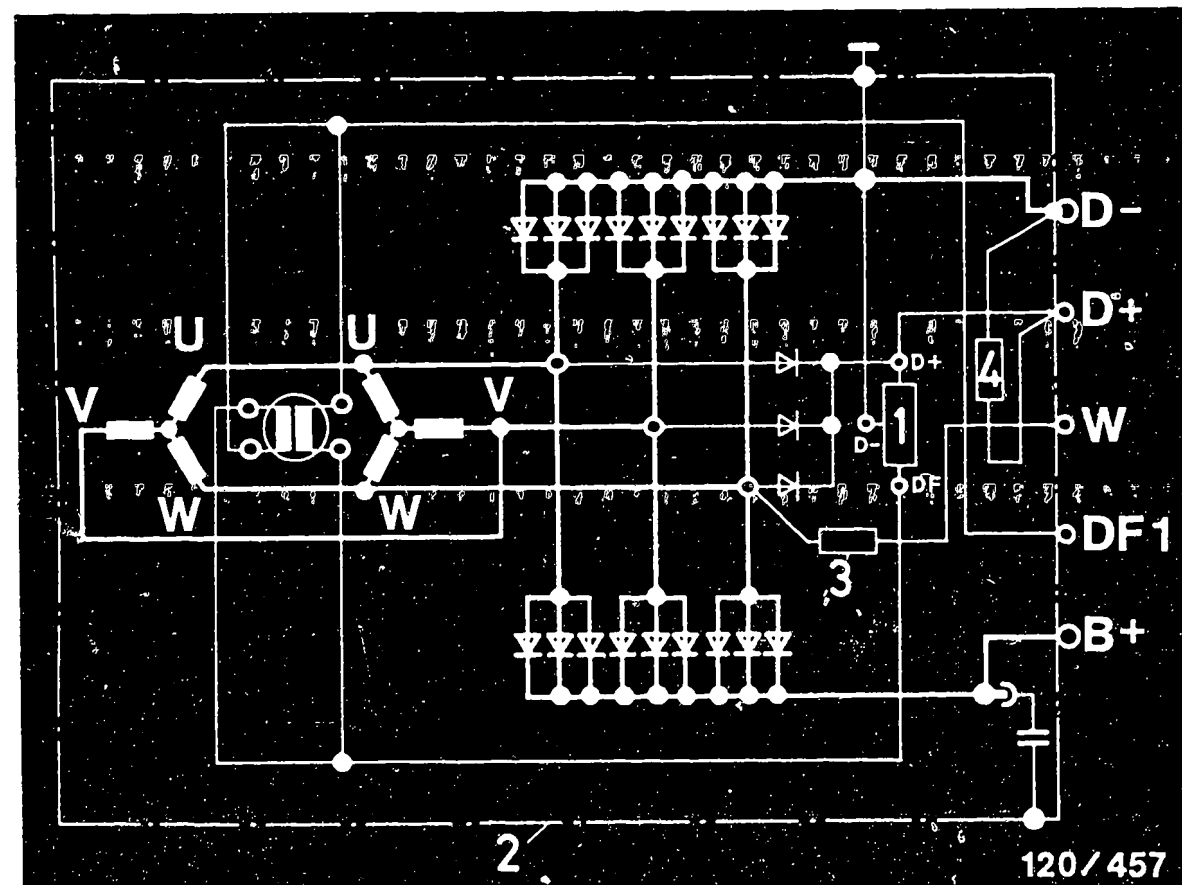




120/498

Tightening torques: Double T1 alternator 0 120 689

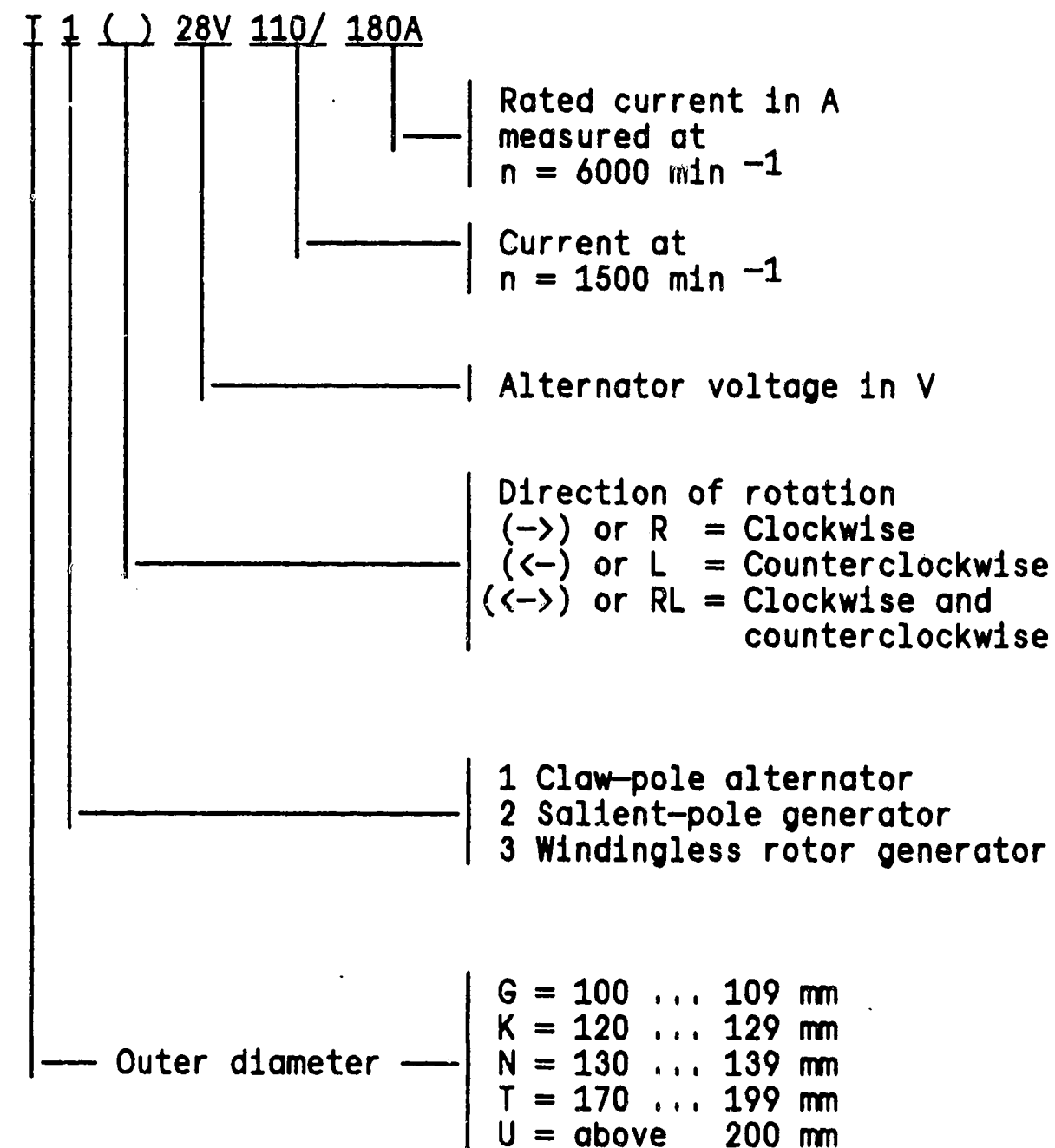
Item 20	= 1.0 ... 1.4 Nm	Item 30	lower nut	= 10 ... 13 Nm
Items 18,38,34 lower nut	= 2.8 ... 3.6 Nm	Item 25	lower nut	= 20 ... 27 Nm
Item 7	= 4.1 ... 5.5 Nm	Item 34	upper nut	= 0.9 ... 1.2 Nm
Item 35	= 4.9 ... 6.6 Nm	Item 30	upper nut	= 3.2 ... 3.6 Nm
Items 15,36	= 7.2 ... 9.7 Nm	Item 25	upper nut	= 6.0 ... 6.5 Nm



- 1 = Regulator
- 2 = Alternator
- 3 = Damping resistor
- 4 = Resistor for open-circuit indication

Circuit diagram of alternator  
Double T1-28V 110/180A

Explanation of type code on generator  
(new designation as of beginning of 1983)  
e.g.: T1 ( ) 28 V 110/180A



## Cleaning the parts

CAUTION ! FIRE HAZARD

Alternators are being increasingly fitted with capacitors of long storage life (e.g. for the interference suppression of receivers and transmitters.

When washing parts of alternators, it may happen that when they are dipped in cleaning fluids, there is a capacitor discharge which may ignite inflammable fluids. For this reason, parts with capacitors must only be washed in HAKU 1025/6.

### Note :

Alternator 0 120 689 519 has been used for compiling these repair instructions.

The various versions of alternator should be taken from the corresponding service-part microcards.

## TEST EQUIPMENT, TOOLS AND ADHESIVES

### Test equipment

Generator test bench EFLJ 91 0 683 300 100

For additional test:

Ignition oscilloscope (all versions)

or

Bosch motortester (all versions)

# Test equipment, tools and adhesives (continued)

Test panel	or	EFAW 81 KDAW 9984	0 681 169 013
Transformer panel	or	EFAW 82 KDAW 9985	0 681 169 014
Insulation tester or test prods		EFAW 84 KDAW 9983	(Included in scope of delivery of EFAW 81 and KDAW 9984)
Dial indicator		EFAW 7	1 687 233 011
Magnetic instrument stand		T-M 1 (EW/MS1 B1)	4 851 601 124 0 601 980 001
Alternator tester	or	EFAW 192 WPG 012.00	0 681 101 403 0 684 201 200
4 feeler gauges 0.15...0.6 mm		KDZV 7399	
Electrics tester		ETE 014.00	0 684 101 400
Voltage stabilizer up to 30 V		Commercially available	

# TEST EQUIPMENT, TOOLS AND ADHESIVES (CONTINUED)

Arbor press	(Commercially available)
Clamping support	KDAW 9999
Two vee-blocks	(commercially available)
Holding device for pulley	KDLI 6006
Clamp-in peg for arbor press	KDLI 6010
Puller for ball bearing	KDLI 6034
Press-in tool for ball bearing and radial seal	KDLI 6033
Press-on tool for collector rings, collector-ring end-shield inner race, and support ring	KDLI 6035
Pin for aligning drive-end shield and collector-ring end shield	KDLI 6014
Press-out mandrel for sliding bushing	KDLI 6015
Collector and support mandrel for sliding bushing	KDLI 6016
Extractor	KDAW 9995
Press-on sleeve for drive-end- bearing housing	KDLI 6021
Puller for deep-groove ball bear- ing, drive side, as of FD 9/87	KDAL 5473

## LUBRICANTS AND ADHESIVES

Molykote paste Ft70v1 Part No. 5 700 040 ...

Rolling-bearing grease Part No. 5 975 560 ...  
Esso Unirex N3

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Epoxy-resin paint      Component A ( 100 parts )
                        Part No. 5 970 720 ...
                        Component B ( 15 parts )
                        Part No. 5 970 730 ...

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### Lubrication quantities

Grease cylindrical-roller  
bearing with 5 ... 6 g Esso Unirex N3

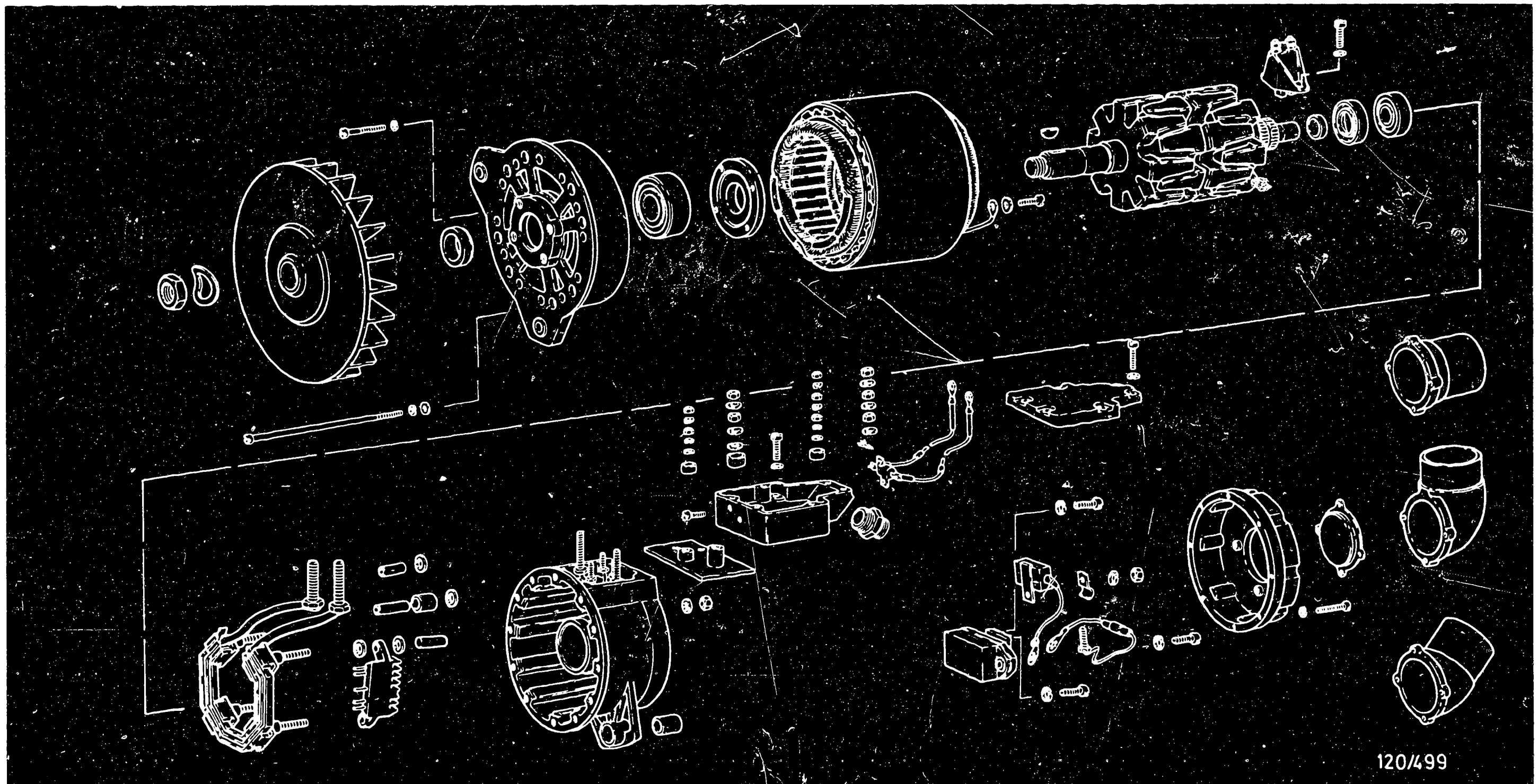
Grease  
radial seal with 3 ... 4 g Esso Unirex N3

Fill grease channels in collector-ring end shield with Esso Unirex N3. Establish quantity by trial and error.

Rub Molykote paste Ft7ov1 into mounting bore of the expansion bushing.

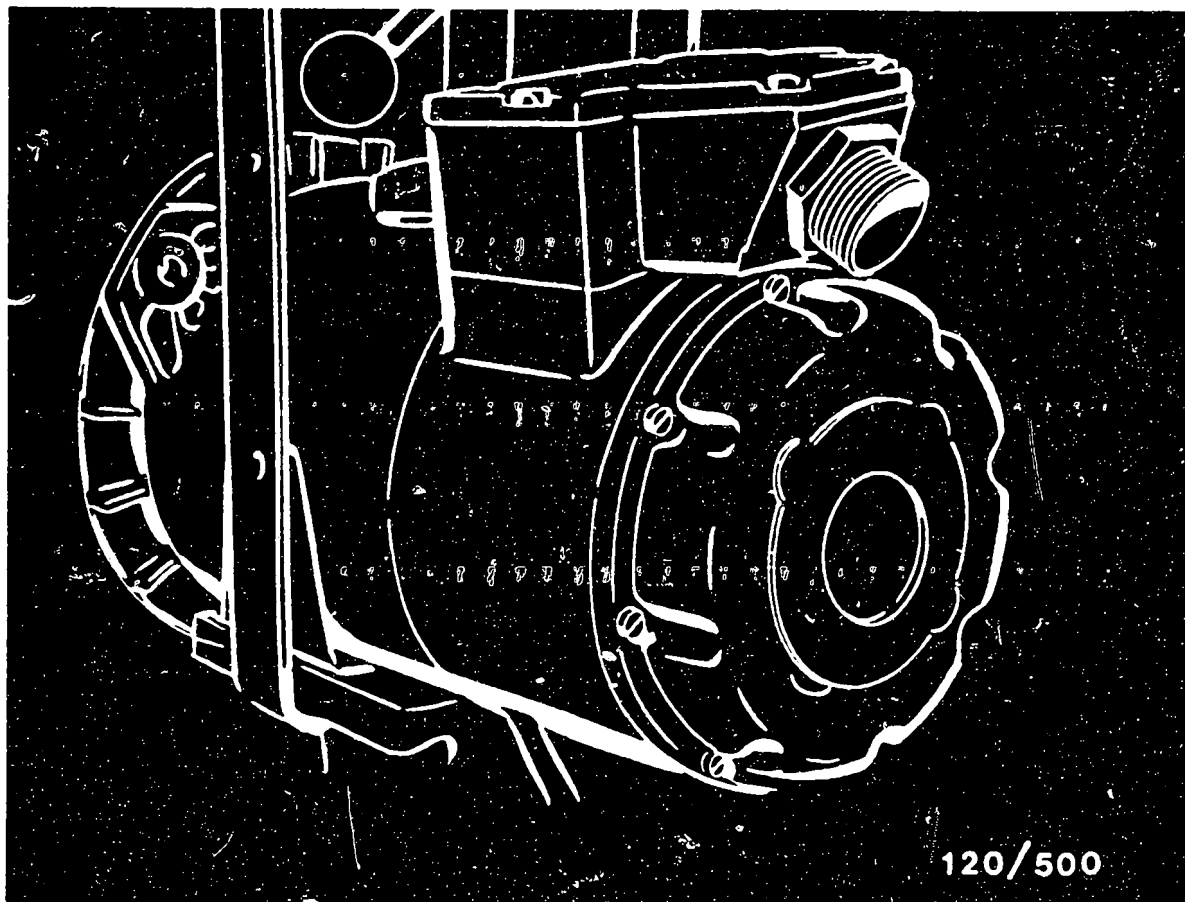
Front threads of the screws Items 7,15, 35,36 and 38 immersed in Molykote paste Ft70v1.

For production reasons:  
continued on the following  
coordinate.



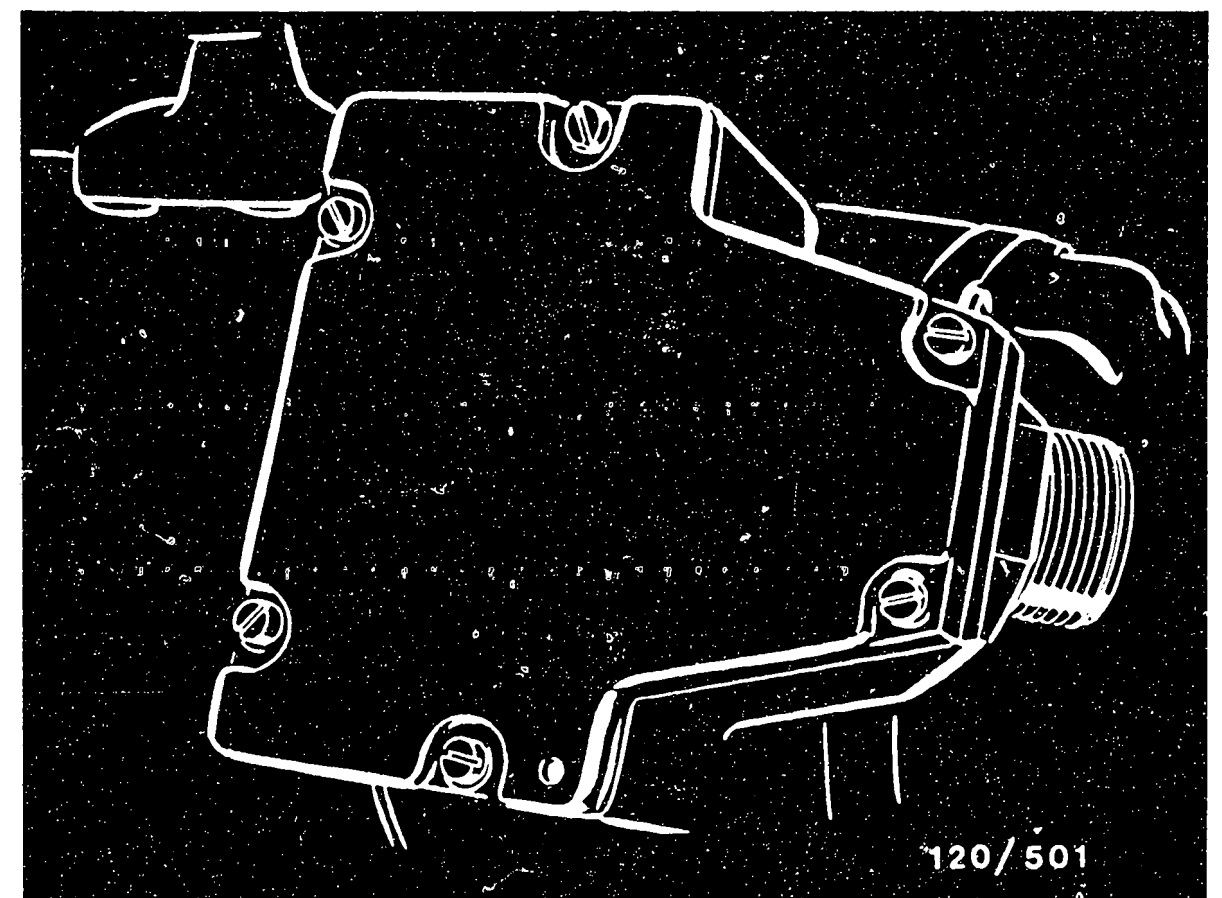
120/499

EXPLODED VIEW - DOUBLE T1 ALTERNATOR 0 120 689..



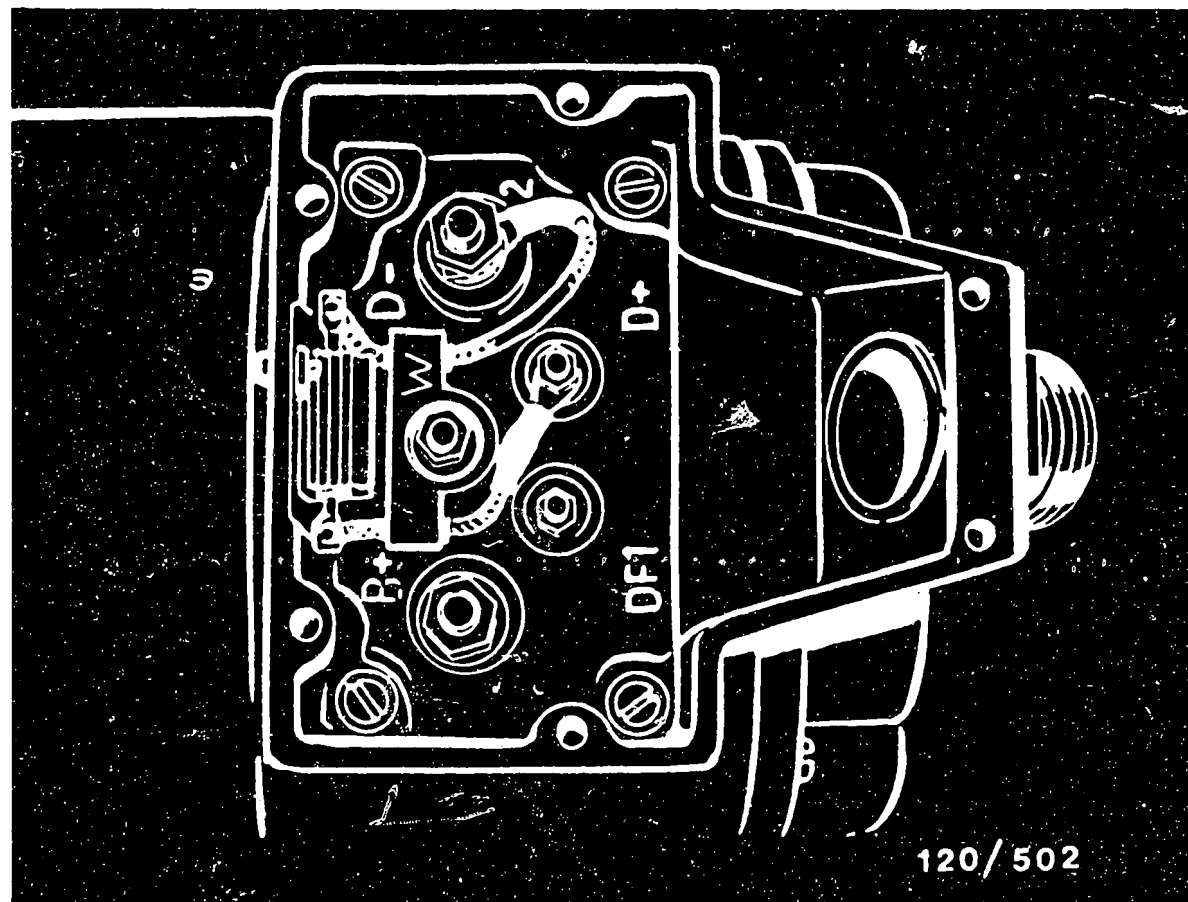
# DISMANTLING THE ALTERNATOR AND TESTING THE PARTS

Clamp alternator in clamping support  
KDAW 9999.



Remove closure plate

Unscrew six fastening screws (see illustration) and  
remove cover plate.



Loosen nuts of terminal studs B+, D-, D+, W, DF1, DF2 and remove.

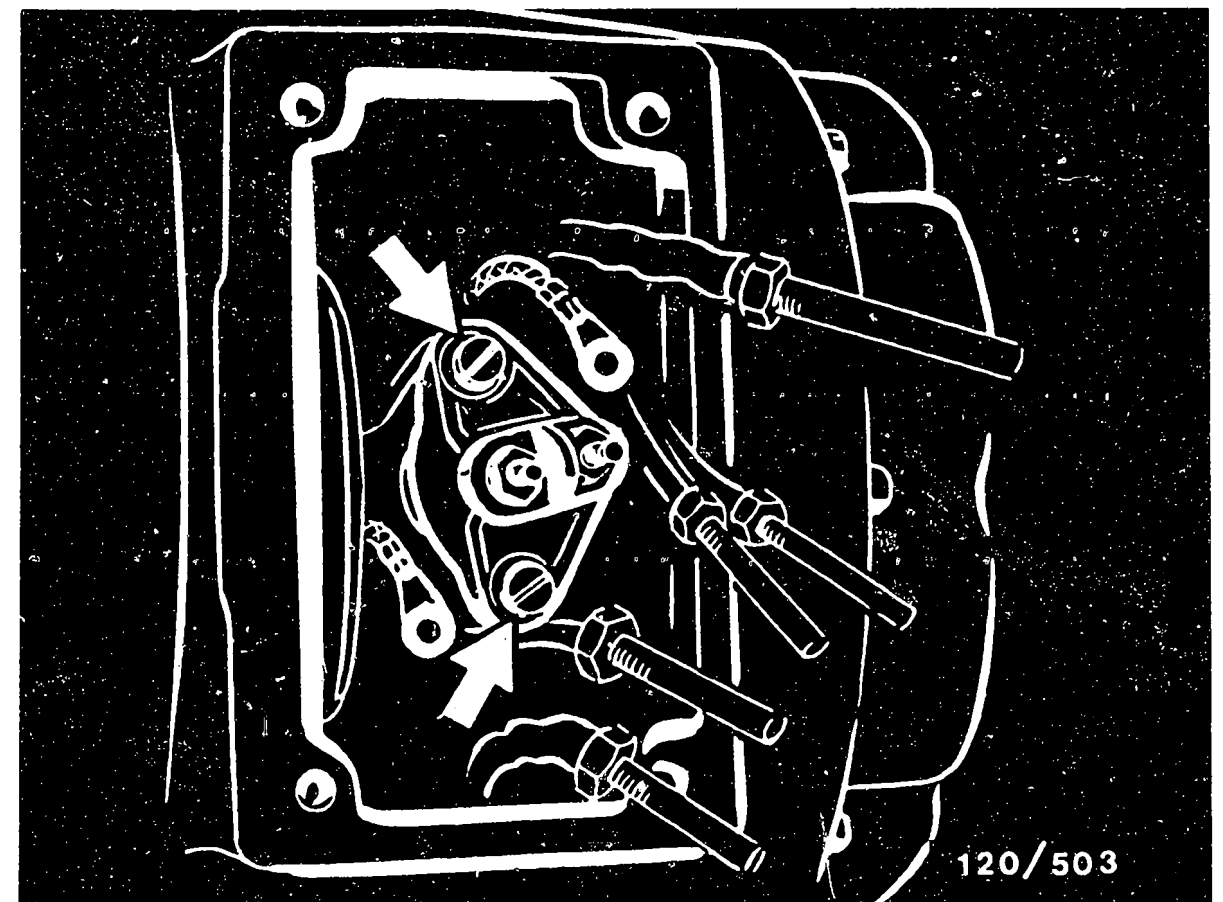
Test resistor between free lines with electric tester ETE 014.00.

Set value 90...110  $\Omega$  (no illustration).

Exchange defective resistor.

Afterwards, loosen four fastening screws of terminal box (see illustration) and remove. Remove terminal box.

Likewise remove fastening plate and insulating plate of the terminal box beneath the terminal box (no illustration).



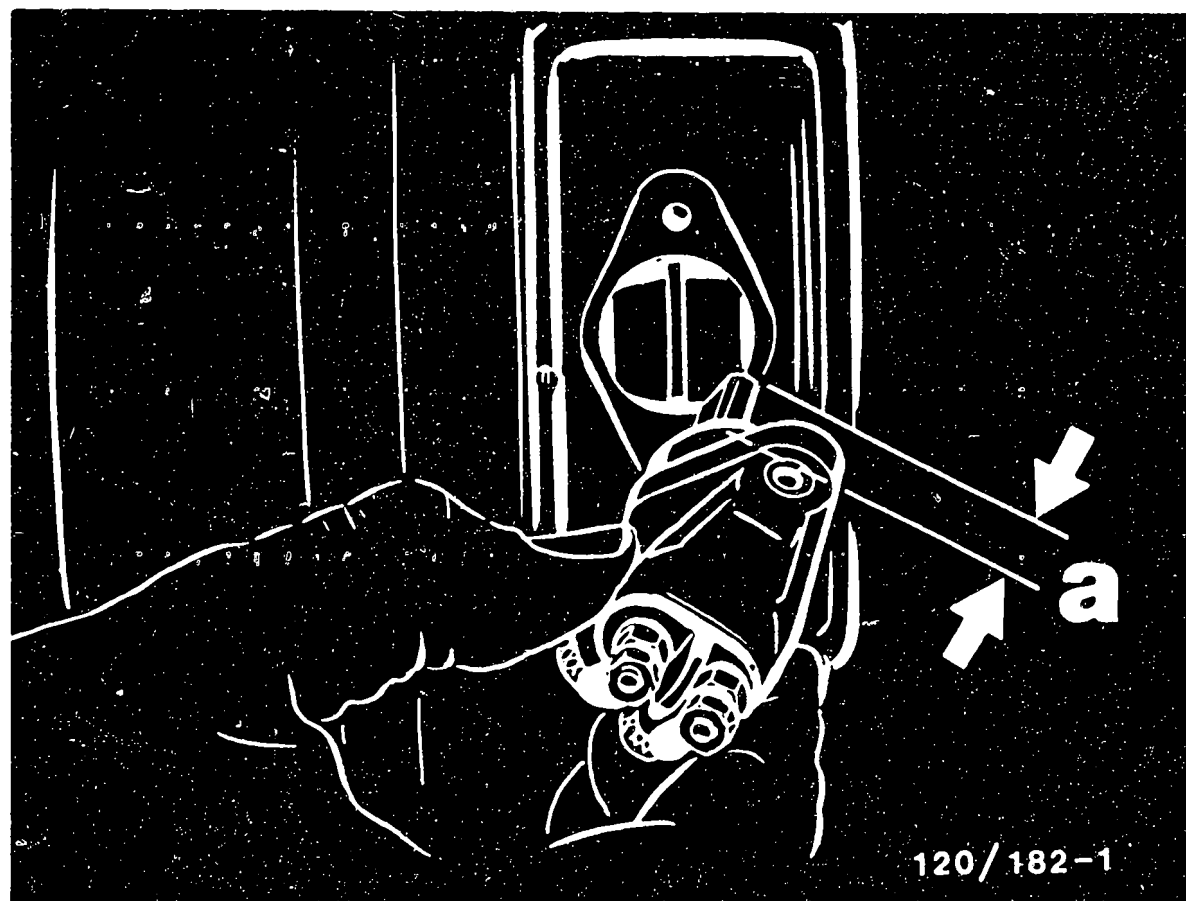
#### REMOVING THE BRUSH HOLDER

Loosen the connections on the carbon-brush holder and remove leads. Mark the leads to avoid any mix-up (polarity of carbon brushes).

Loosen two fastening screws of the carbon-brush holder (see arrows) and remove.

Remove carbon-brush holder from the alternator housing.





#### TESTING THE CARBON-BRUSH HOLDER FOR DAMAGE AND EXCHANGING THE CARBON BRUSHES

If the carbon brushes are broken off or if the projection dimension "a" is less than 7 mm, replace the carbon brushes.

Observe dimension "a" when installing the new carbon brushes.

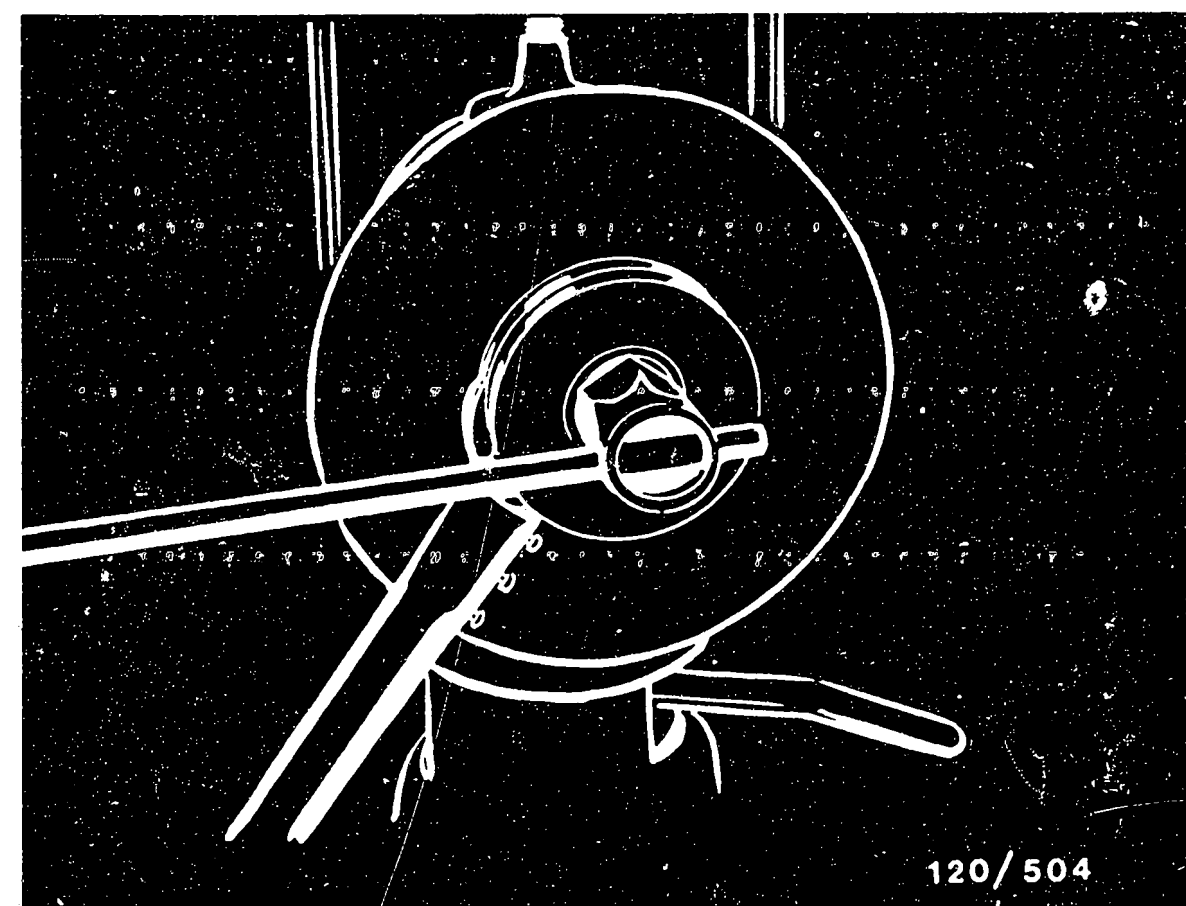
Carbon-brush projection, new 18,5...22 mm

Minimum projection of brushes 7 mm

Check carbon brushes for freedom of movement after installing.

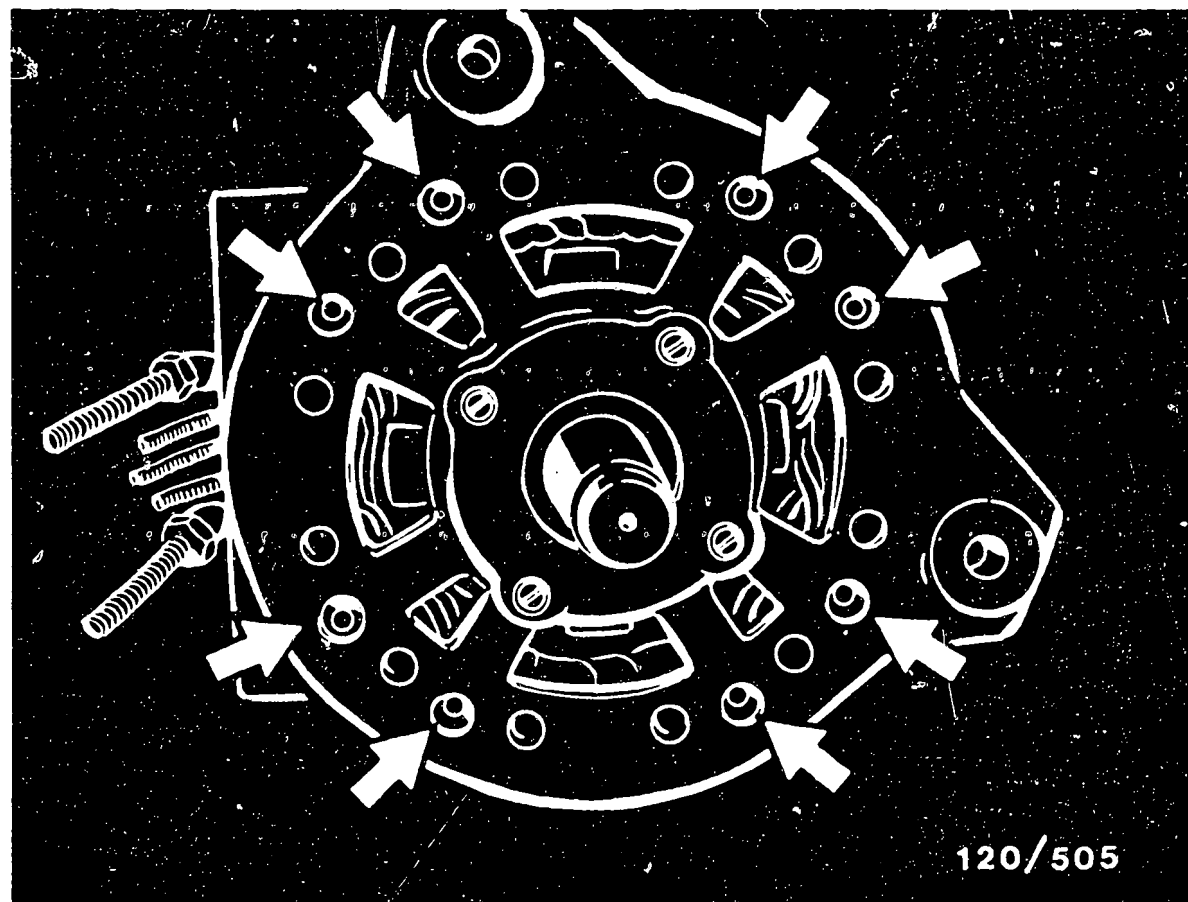
When installing new carbon brushes, turn the diameter of the collector rings.

Minimum diameter of the collector rings 37,7 mm



#### REMOVING THE PULLEY AND FAN

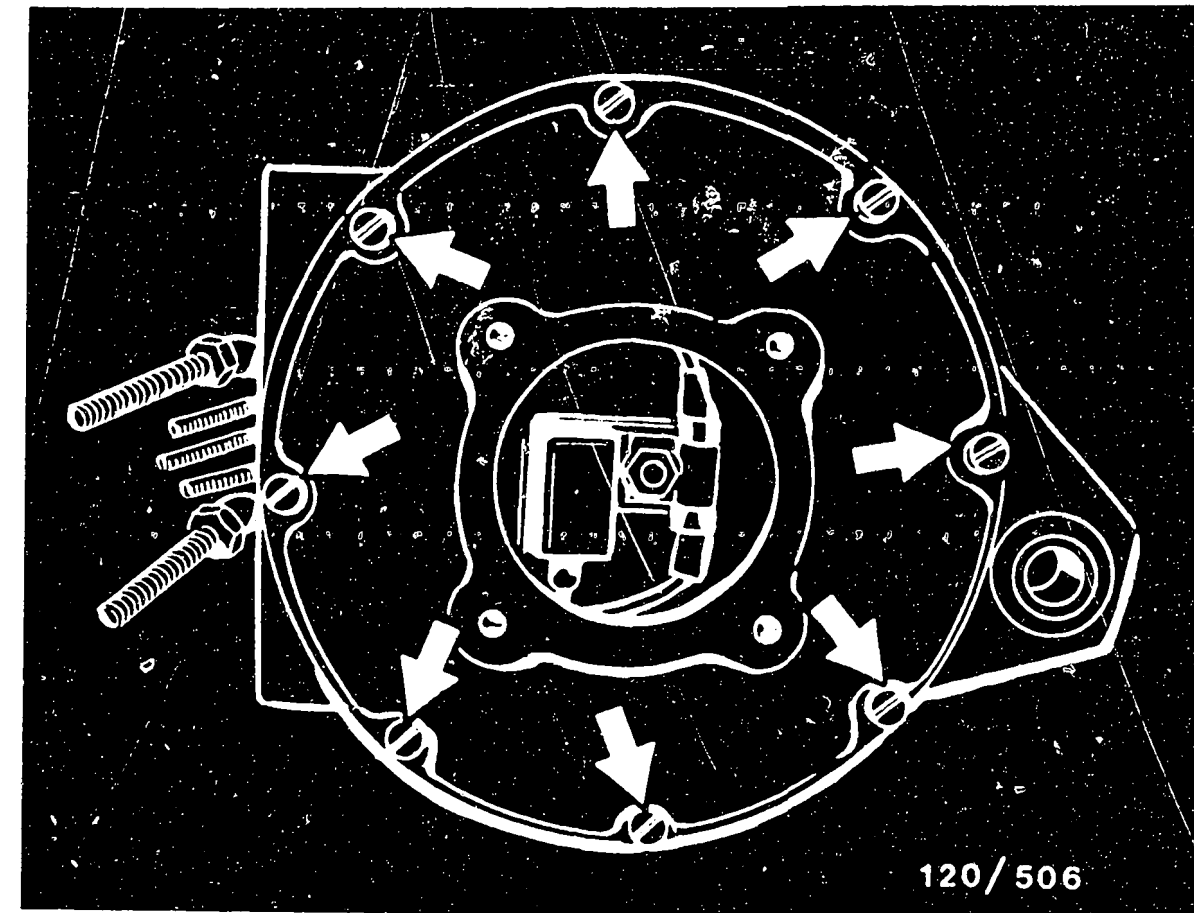
Using holding device KDLI 6006 and box wrench (36 mm A/F), loosen the fastening nut and remove the pulley and fan.



**Note :**

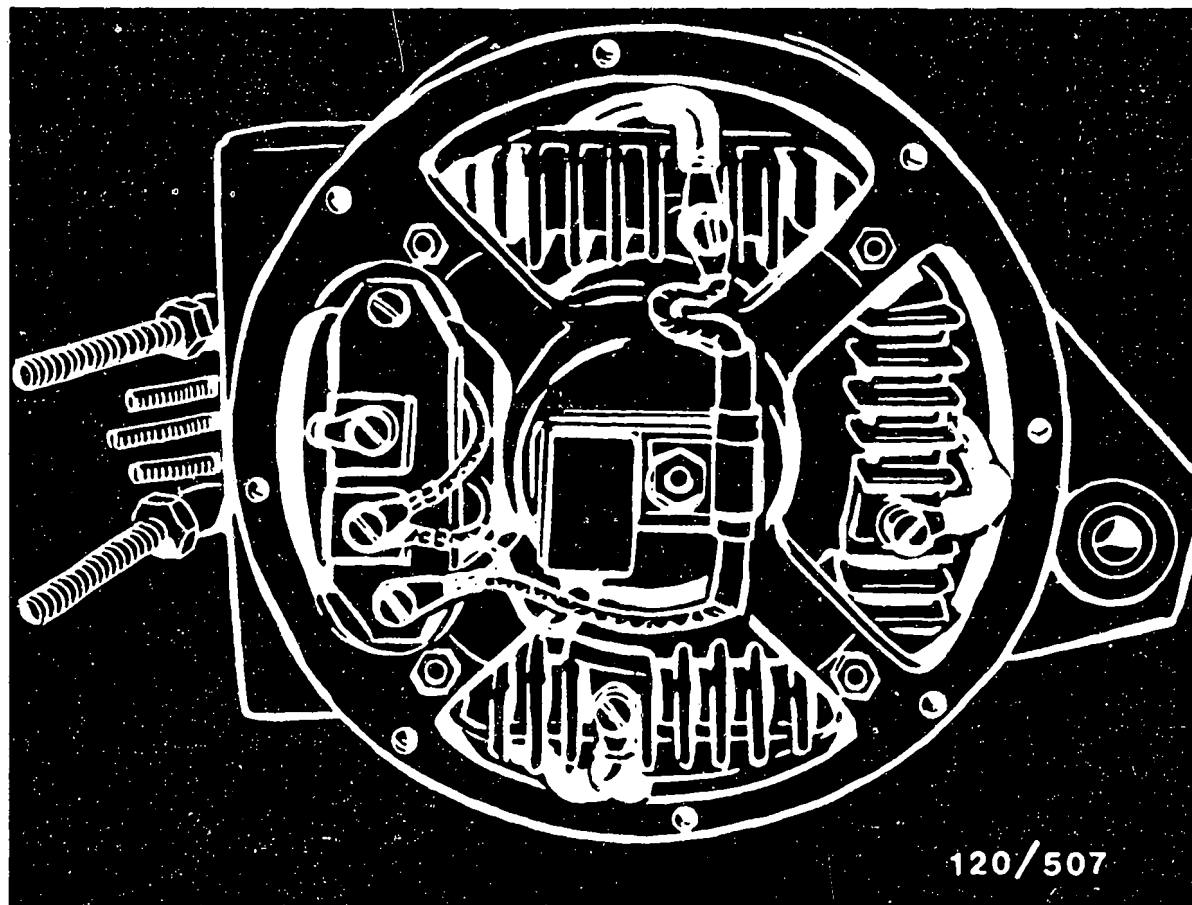
Before the alternator is further dismantled, mark the drive-end shield, collector-ring end shield, and stator so that these parts are brought into the same position again when assembling.

Loosen eight fastening screws (arrows) and remove. Remove drive-end shield with rotor from stator.



**REMOVING THE AIR-INTAKE COVER**

Loosen eight fastening screws (see arrows) of the air-intake cover and remove. Remove air-intake cover.



### TESTING THE RECTIFIER

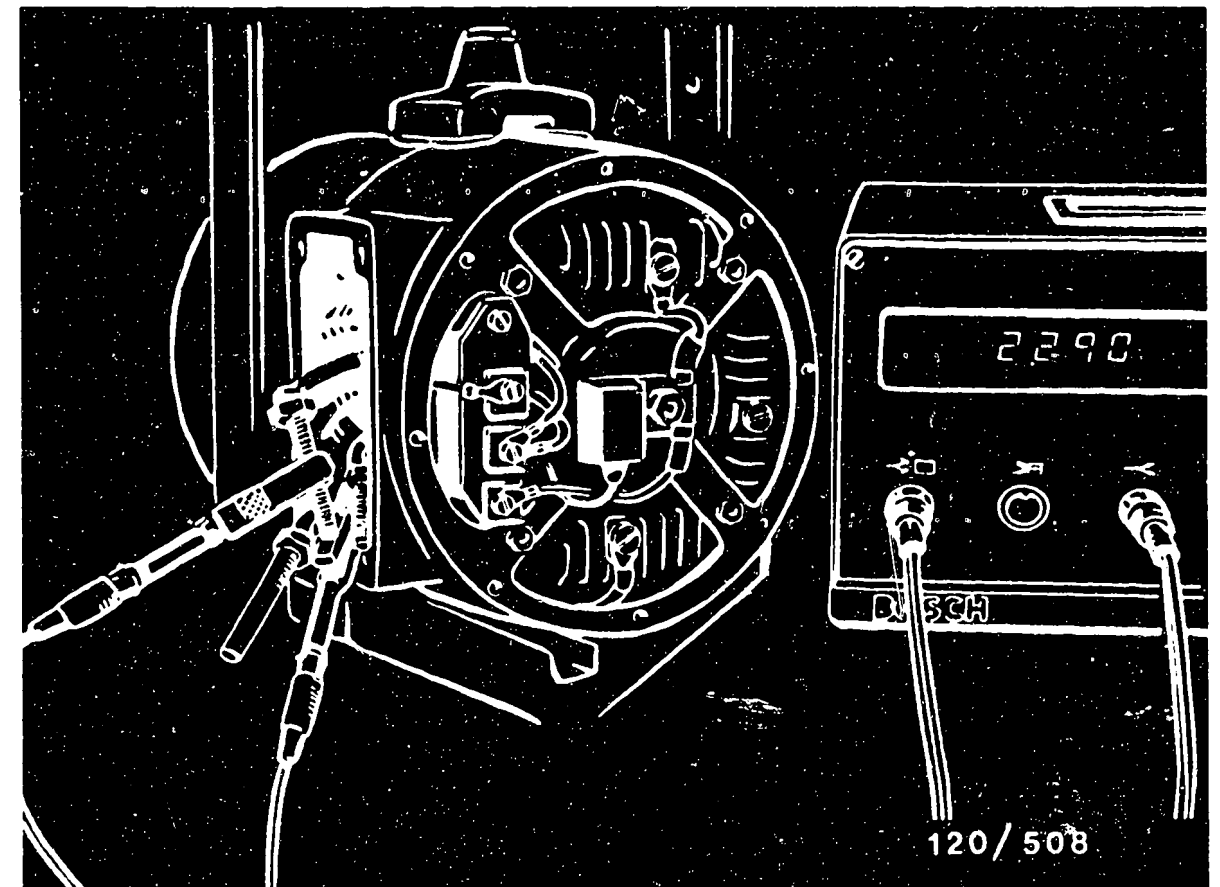
Test the rectifier in wired-up state with EFAW 192 or WPG 012.00 for proper functioning.

Capacitor not connected.

Measuring points: Housing and winding ends  
B+ and winding ends  
D+ and winding ends

The rectifier is O.K. if the pointer of the tester is in the green zone for these measurements.

If one or more diodes are defective, test the rectifier heat sink separately and exchange the heat sink with defective diode.



### TESTING THE SUPPRESSION CAPACITOR

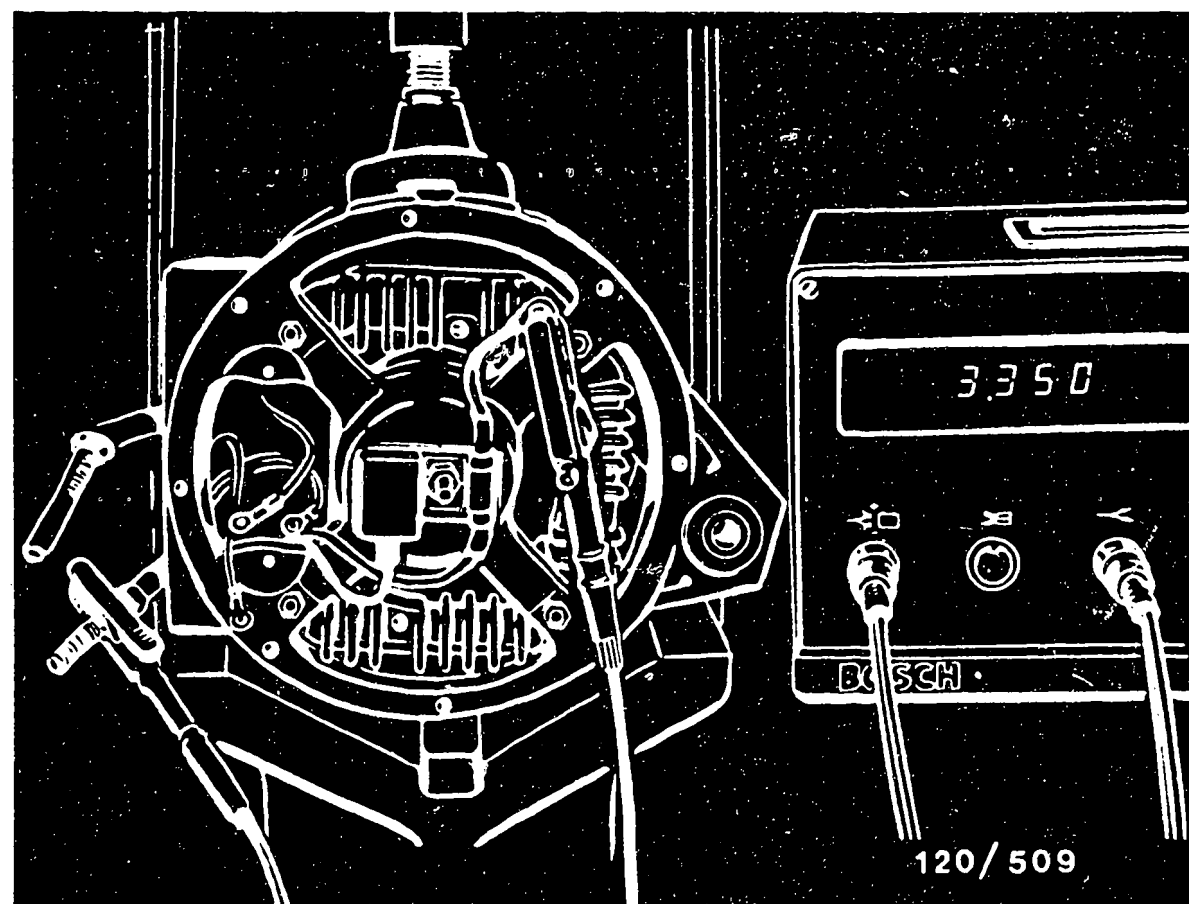
Connect electric tester between lead of suppression capacitor and terminal B- of the alternator (illustration).

Set value: 1,8...2,4  $\mu$ F

If this set value is not obtained, replace the defective suppression capacitors.

After testing, discharge the suppression capacitor by short-circuiting, so that there is no possibility of the cleaning liquid igniting when the parts are being cleaned.

Unscrew regulator and mark the leads.



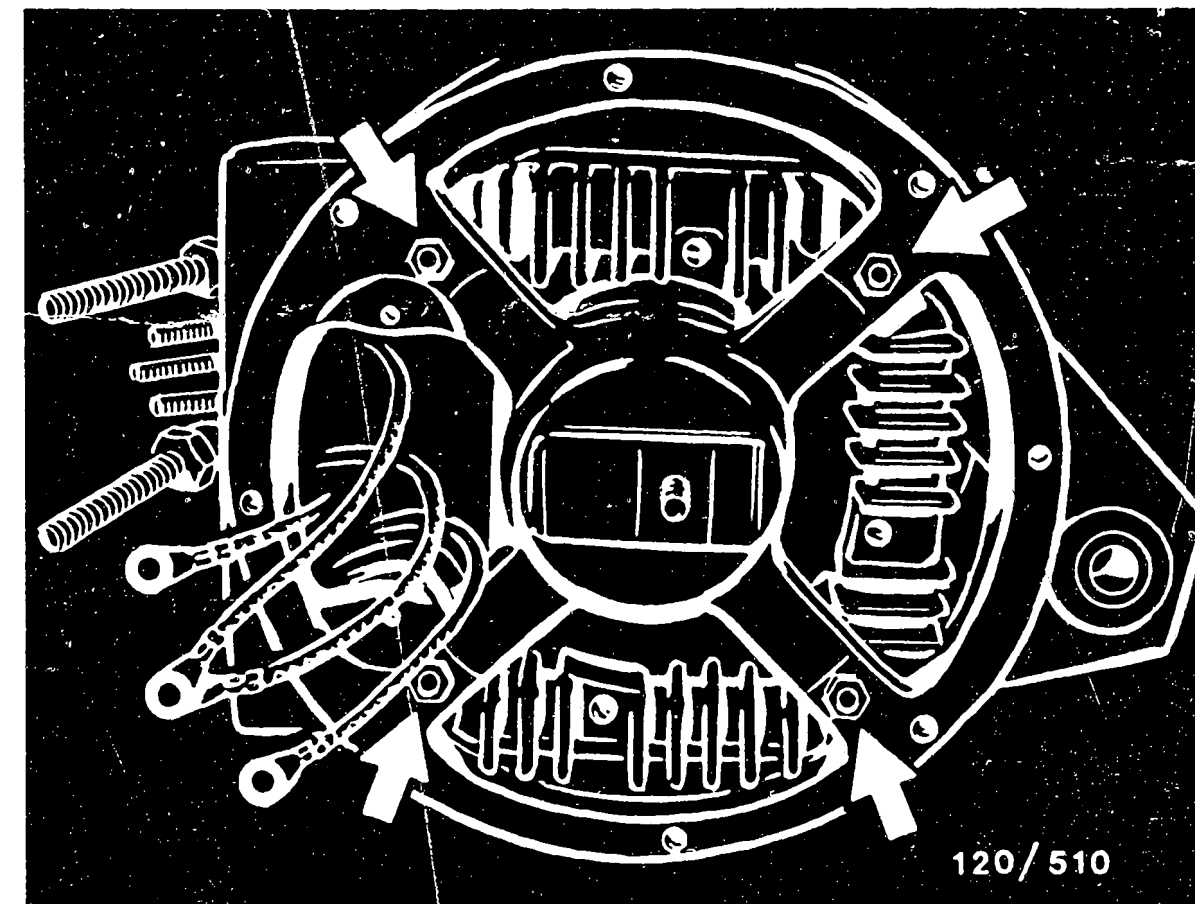
### TESTING THE DAMPING RESISTOR

Loosen the connection of the damping resistor from the rectifier.

Connect eletrics tester ETE 014.00 as shown in the illustration

Resistance 3,1...3,5 k  $\Omega$

Exchange the defective resistor.



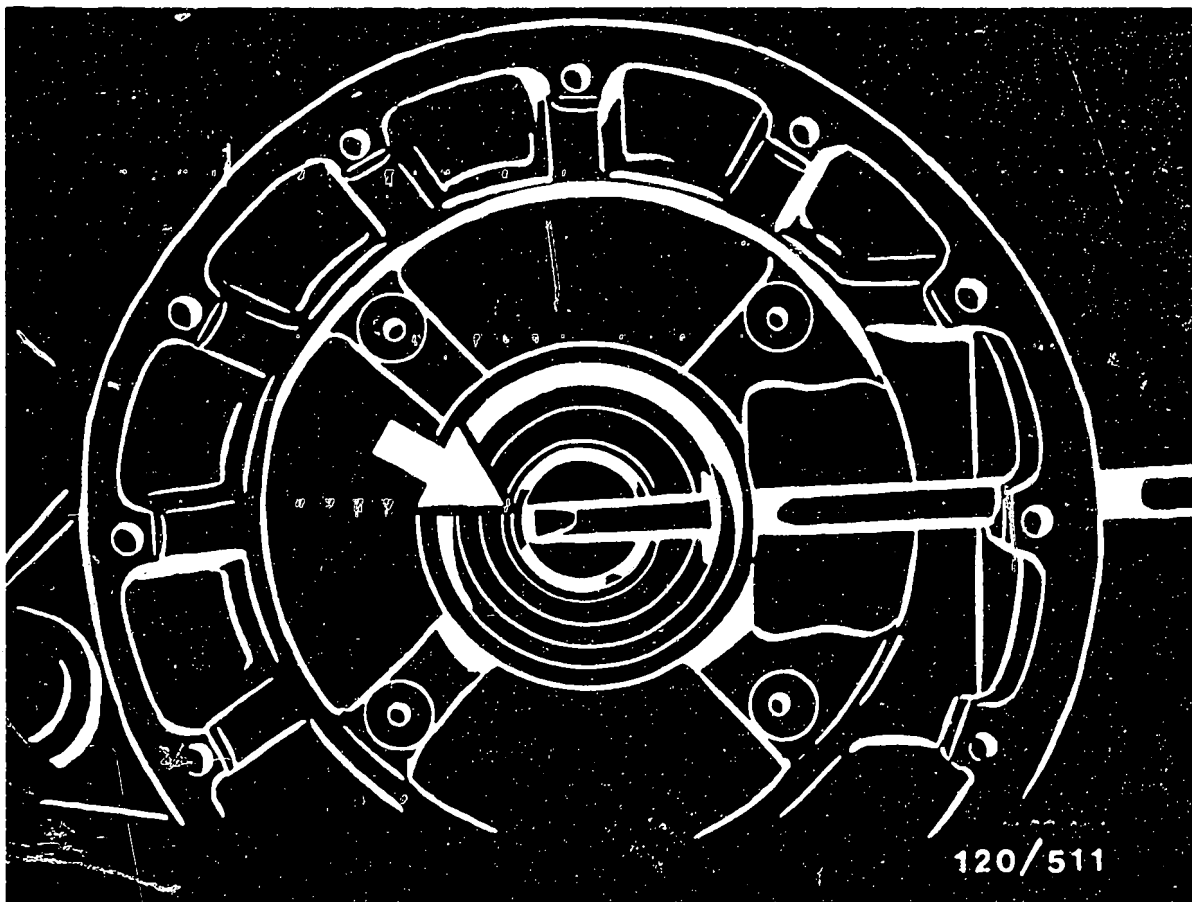
### REMOVING THE RECTIFIER

Loosen the stator connections from the rectifier.

Loosen four nuts (arrows) and remove.

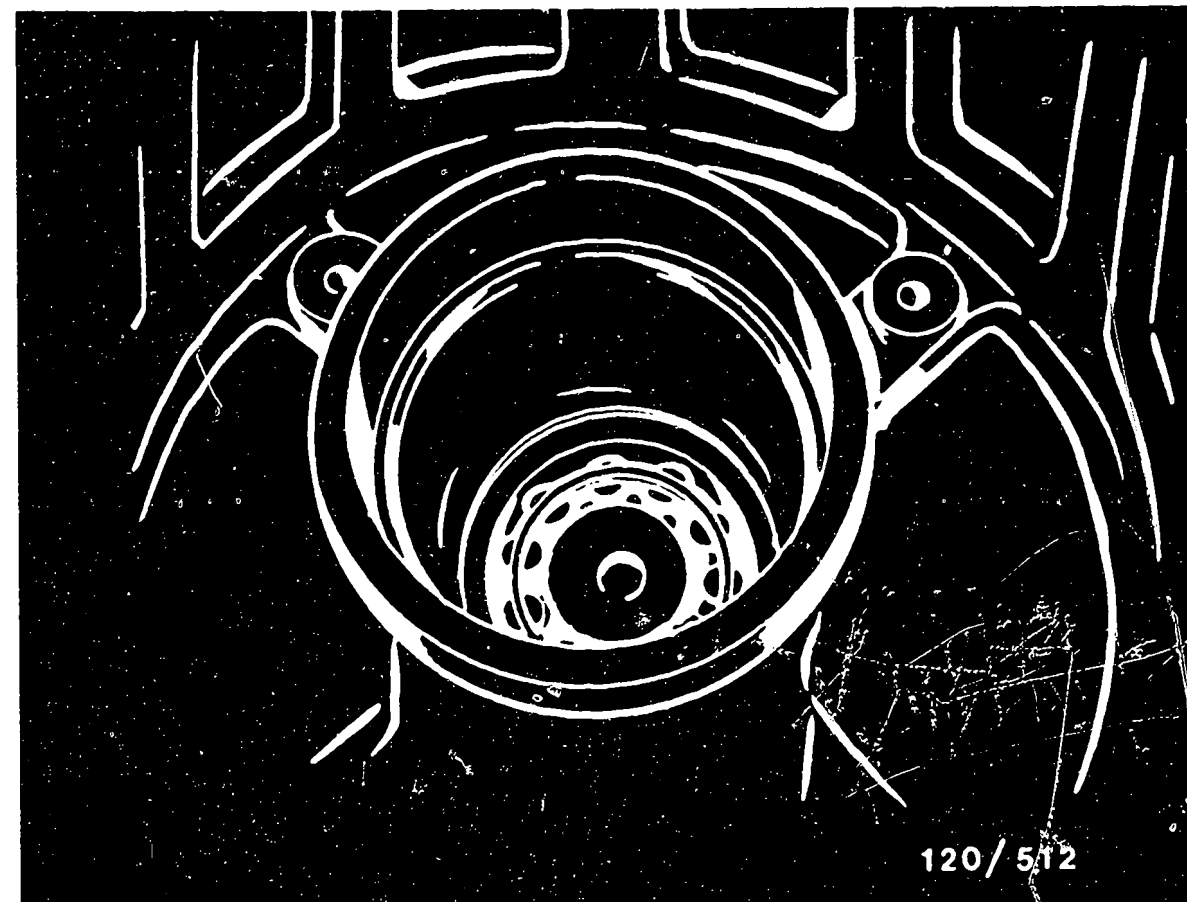
Pull the rectifier out of the rectifier bearing and exchange the defective rectifier if necessary.

The rectifier consists of 3 rectifier blocks and can thus be repaired as well.



PUSHING OUT THE RADIAL SEAL

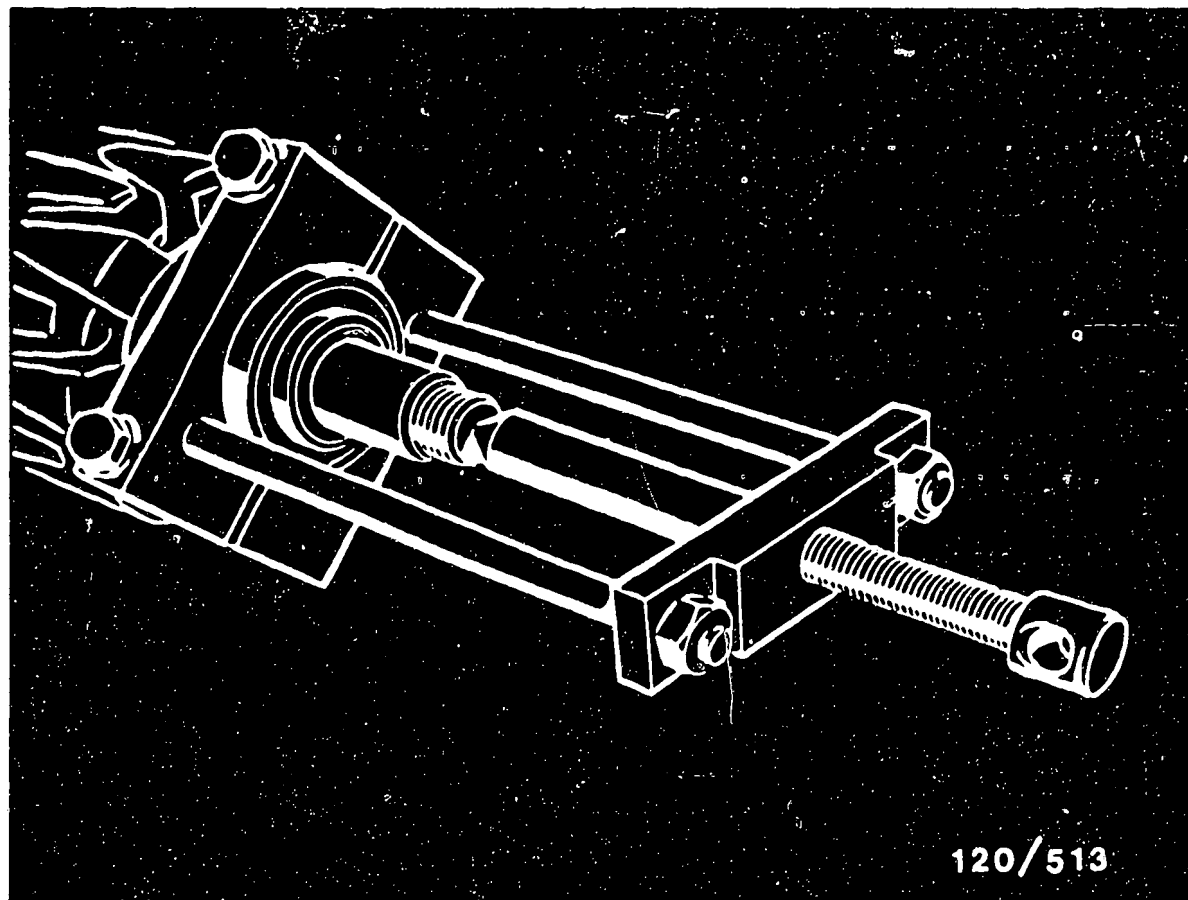
Check the radial seal (see arrow) for damage and, if necessary, press the seal out of the rectifier bearing as shown in the illustration.



REMOVING THE CYLINDRICAL-ROLLER BEARING

Introduce puller KDLJ 6034 in dismantled state into the cylindrical-roller bearing.

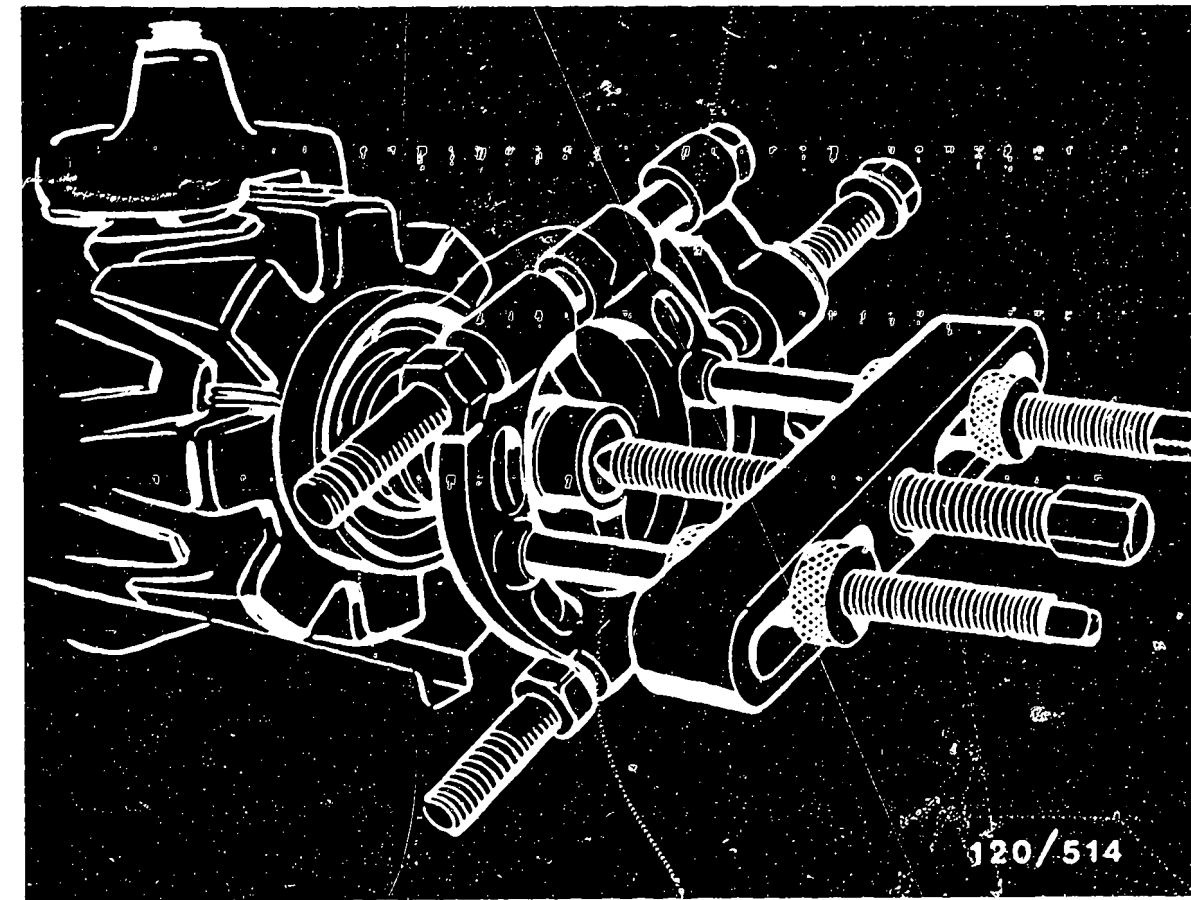
Position the extractor KDAW 9995 on to the puller and pull out the cylinder-roller bearing (no illustration).



PULLING OFF THE CYLINDRICAL-ROLLER BEARING, DRIVE SIDE

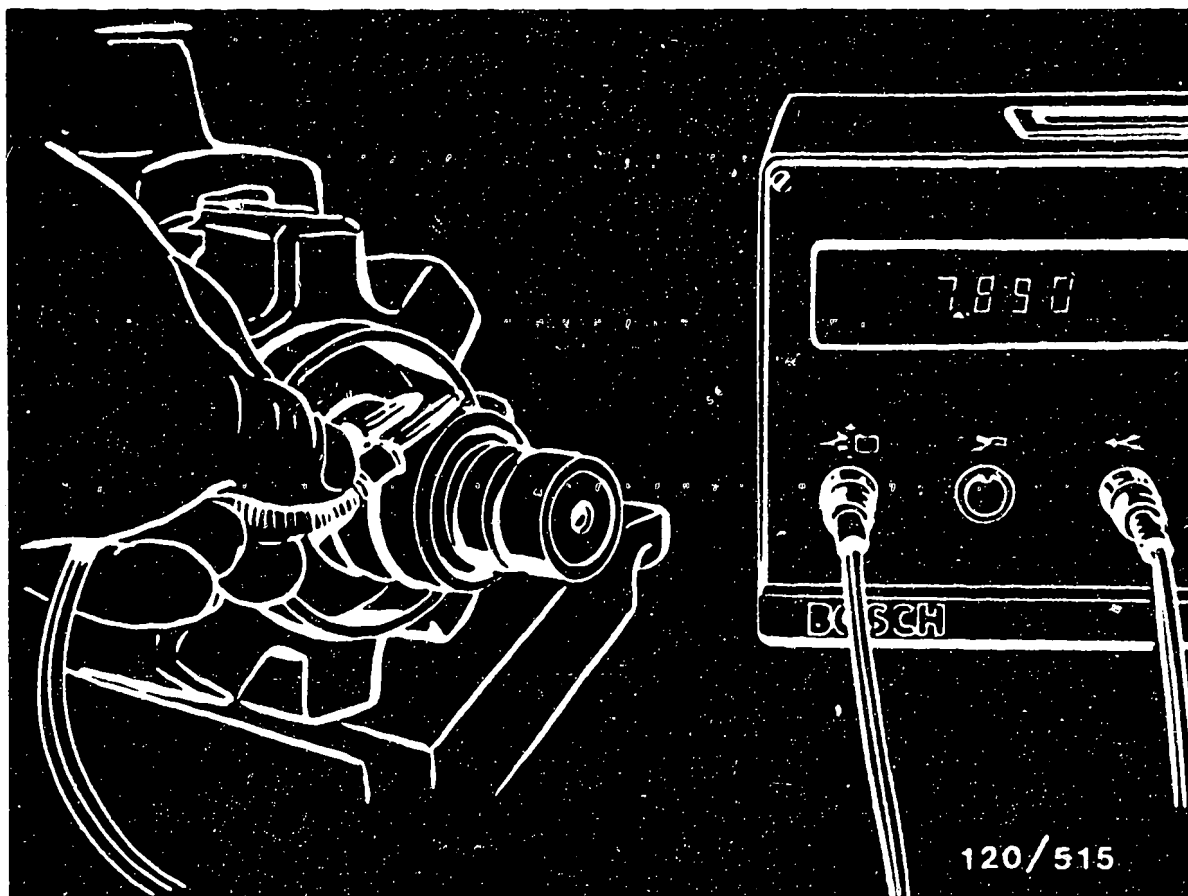
Clamp rotor into the clamping support as shown in the illustration.

Using puller KDAL 5473, pull off the deep-groove ball bearing.



REMOVING THE INNER RACE OF THE CYLINDRICAL-ROLLER BEARING

Using a commercially available puller, remove the cylindrical-roller-bearing inner race. Whenever exchanging the cylindrical-roller bearing, always exchange the inner race as well.

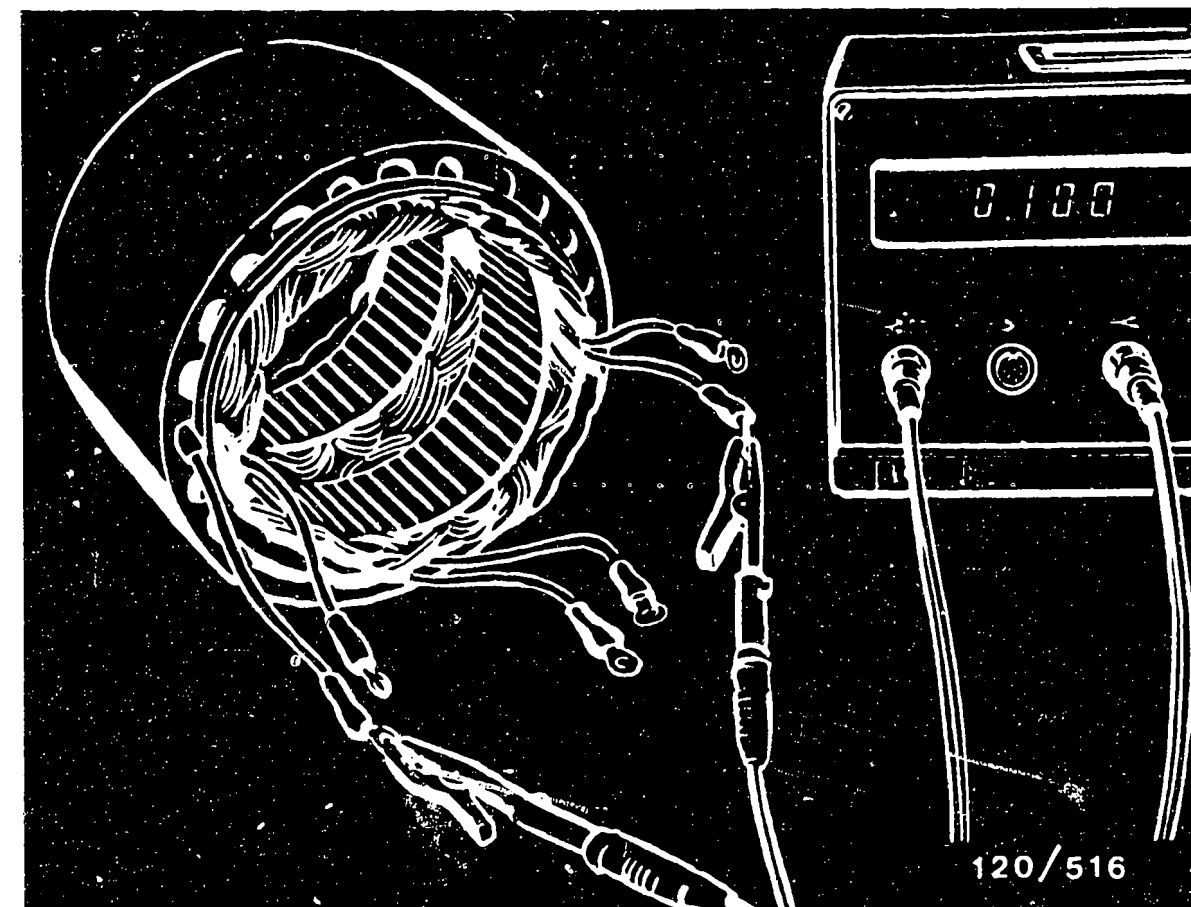


# TESTING THE ROTOR RESISTANCE

Measure the rotor resistance with the electric tester ETE 014.00 (illustration).

Resistance at alternator

Designation	$\Omega$ + 10%
T1 - 28V110/180A	7.5

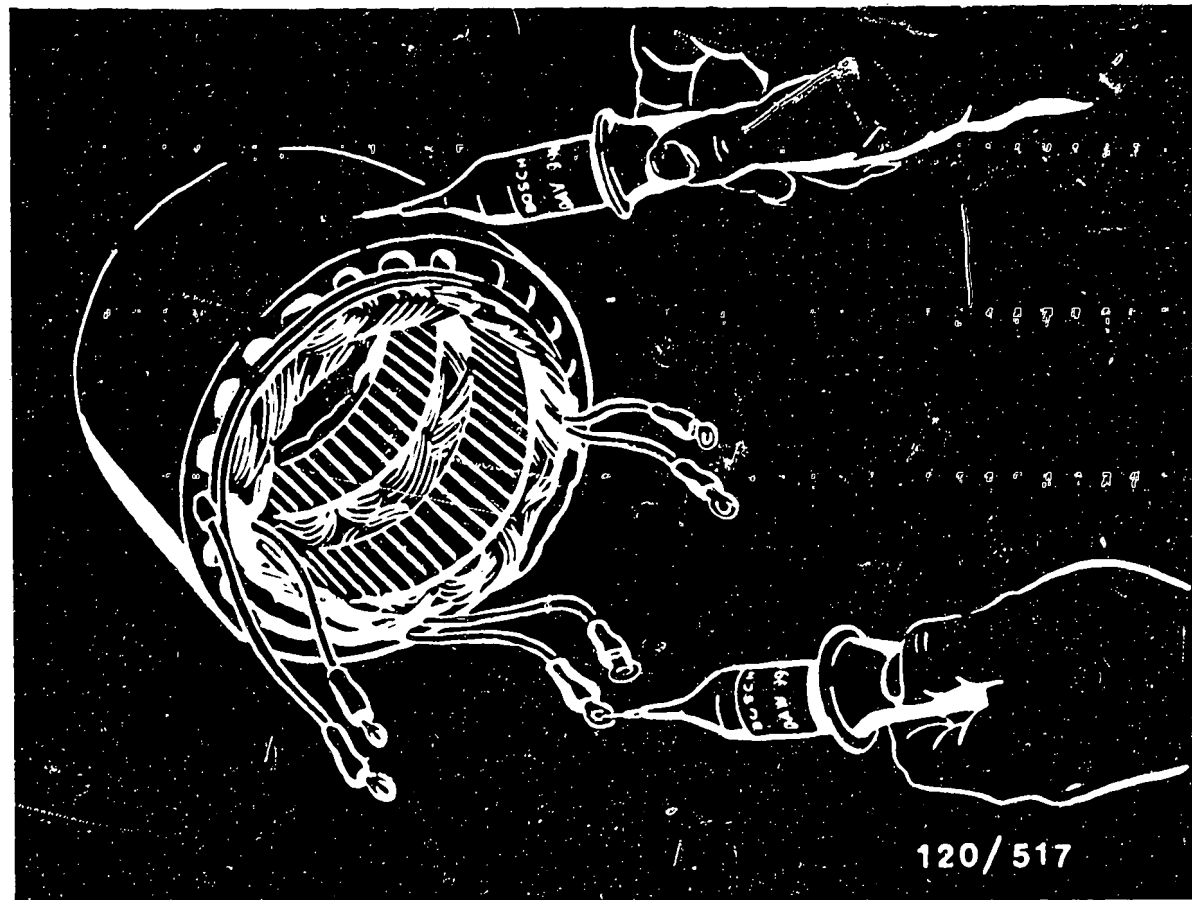


# TESTING THE STATOR (RESISTANCE)

Test the resistance of the stator while installed (illustration).

Note the position of the switch on the tester. Resistance measured between the phase outputs on the alternator:

Designation	$\Omega$ + 10%
T1 - 28V110/180A	0.1



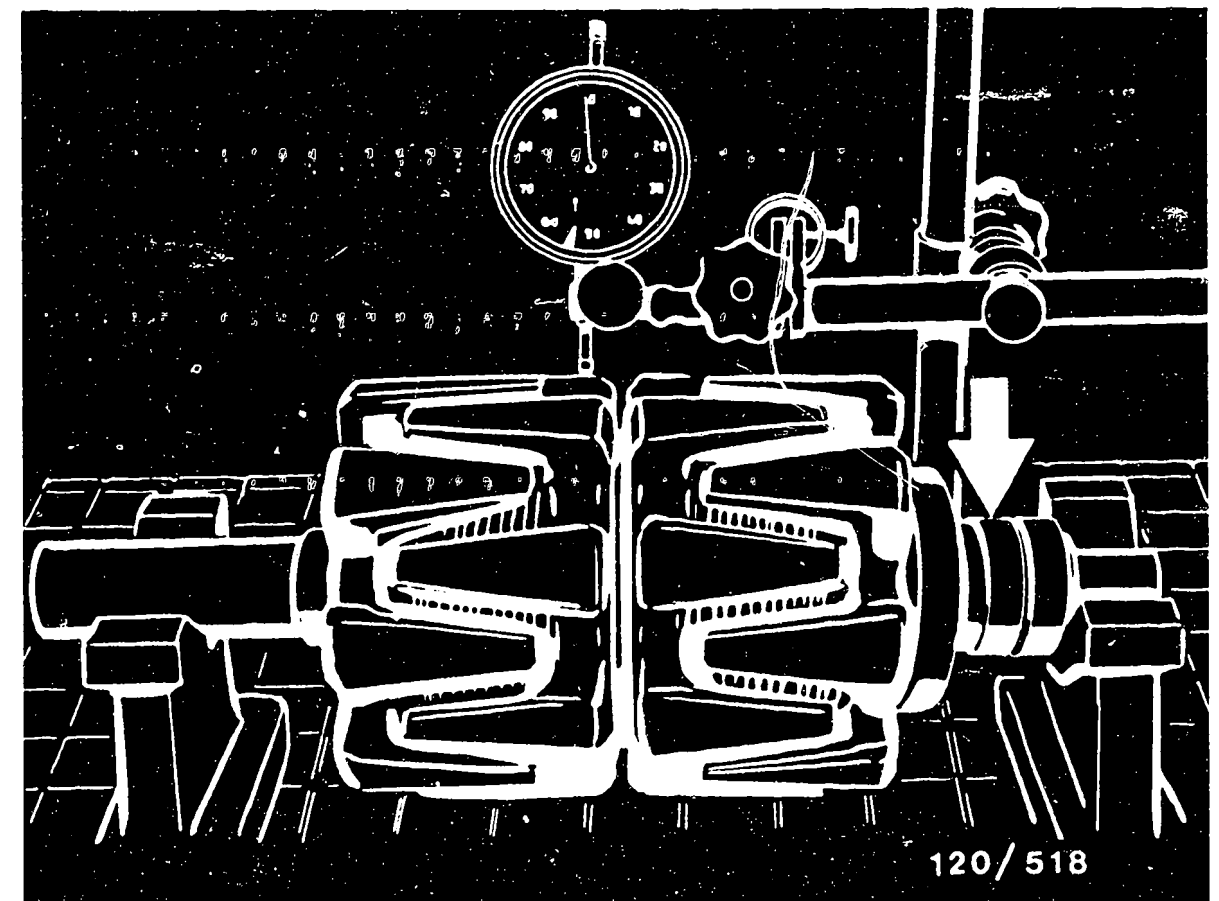
#### TESTING THE STATOR AND ROTOR FOR SHORT CIRCUIT TO GROUND

Test the stator for short circuit to ground using test prods EFAW 84 or KDAW 9983.

Test voltage 40 V a.c.

Test the rotor for short circuit to ground using test prods EFAW 84 or KDAW 9983 (no illustration).

Test voltage 40 V a.c.



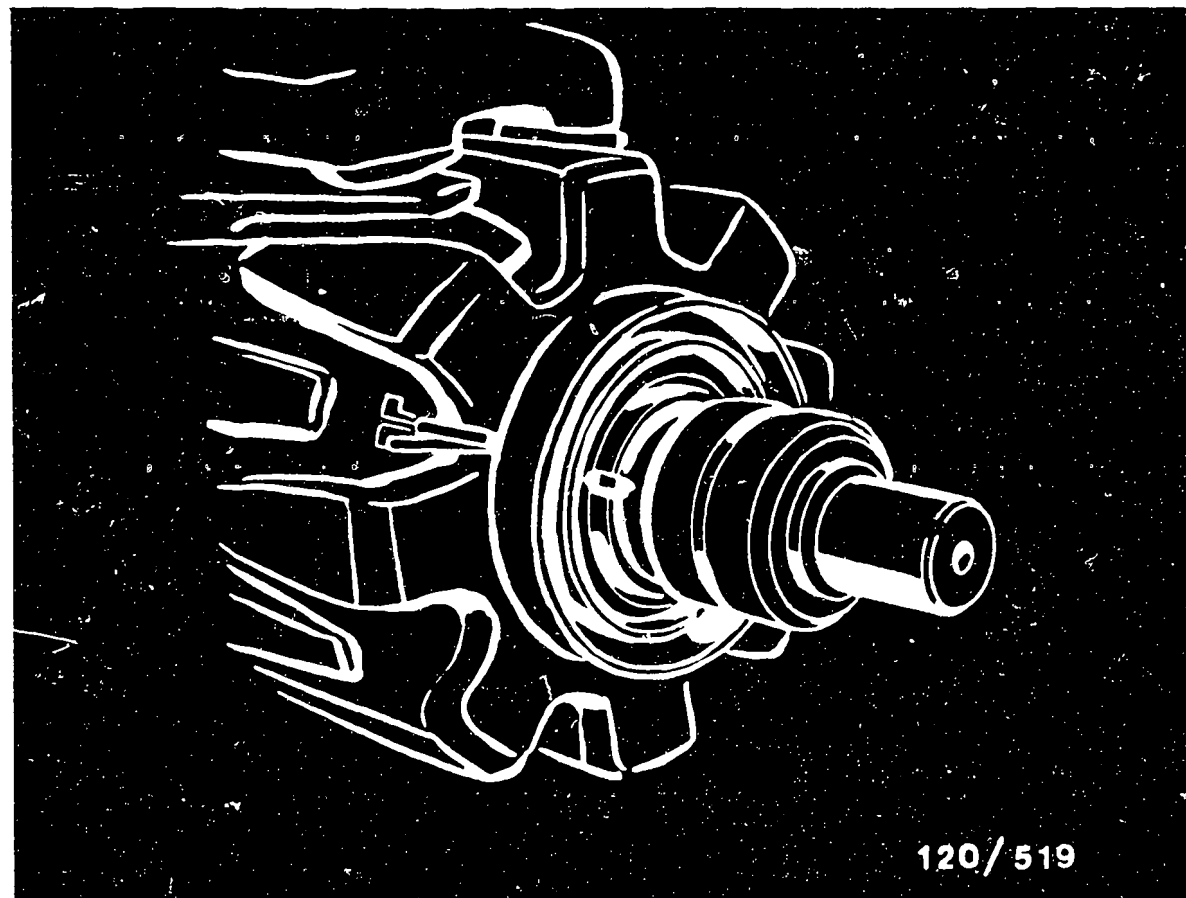
#### TRUE-RUNNING TEST

Mount the journals of the rotor in the V-supports, and align exactly horizontal. Carry out the true-running test on outside diameter of rotor and on outside diameter of the collector rings (see arrow) using magnetic instrument stand T-M 1 (4 851 601 124) and dial indicator EFAW 7.

Maximum error on collector rings 0.03 mm.  
If error is greater, skim collector rings.

Minimum diameter of collector rings 37,7 mm





## REMOVING THE COLLECTOR RINGS

Unsolder leads of the excitation winding from the collector rings and using a commercially available puller, remove the collector rings from the rotor shaft.

## CLEANING THE PARTS

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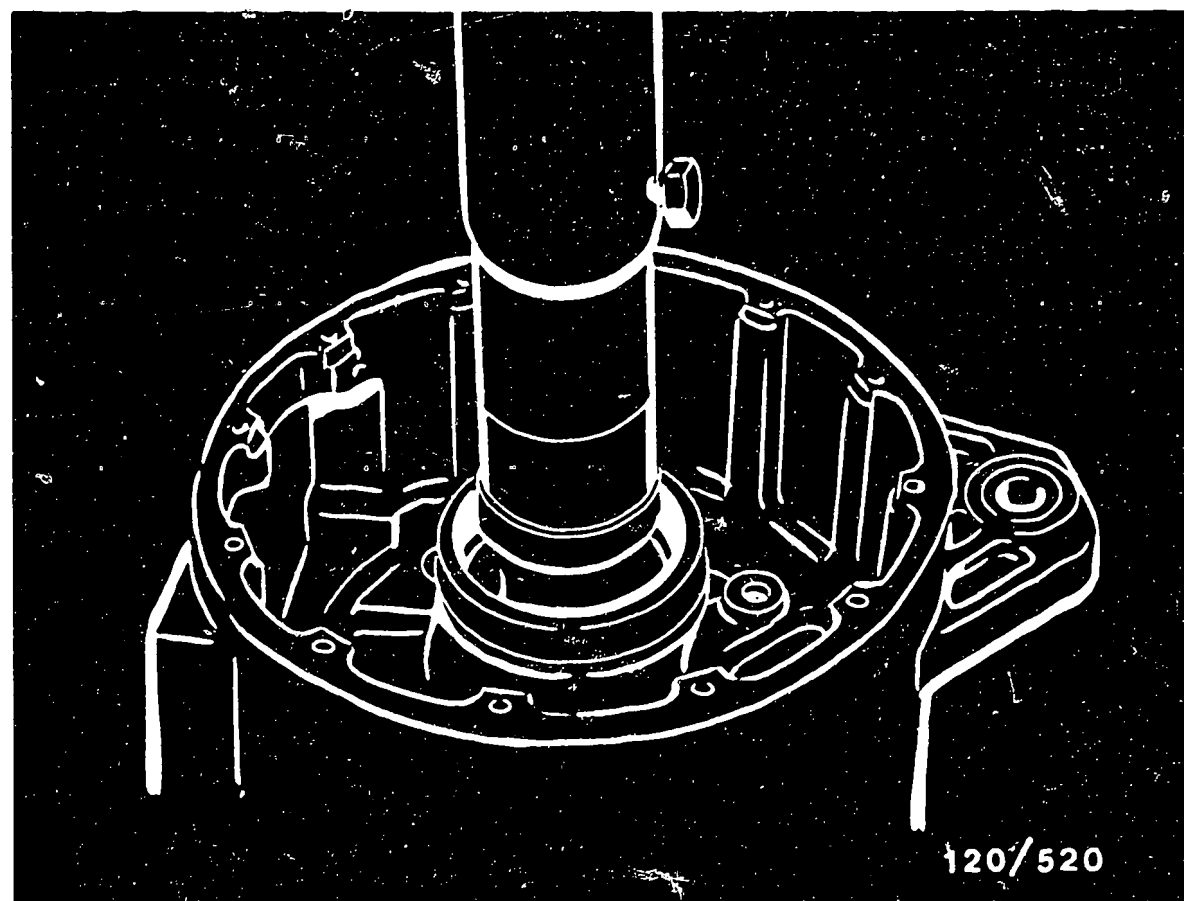
CAUTION ! FIRE HAZARD

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Alternators are increasingly being fitted with long- storage capacitors (e.g. for the interference suppression of receivers and transmitters).

When washing parts of the alternator, it is possible for the capacitor to discharge when immersed in cleaning fluids, there then being the danger that inflammable liquids will ignite.

For this reason, parts with capacitors must only be washed in HAKU 1025/6.

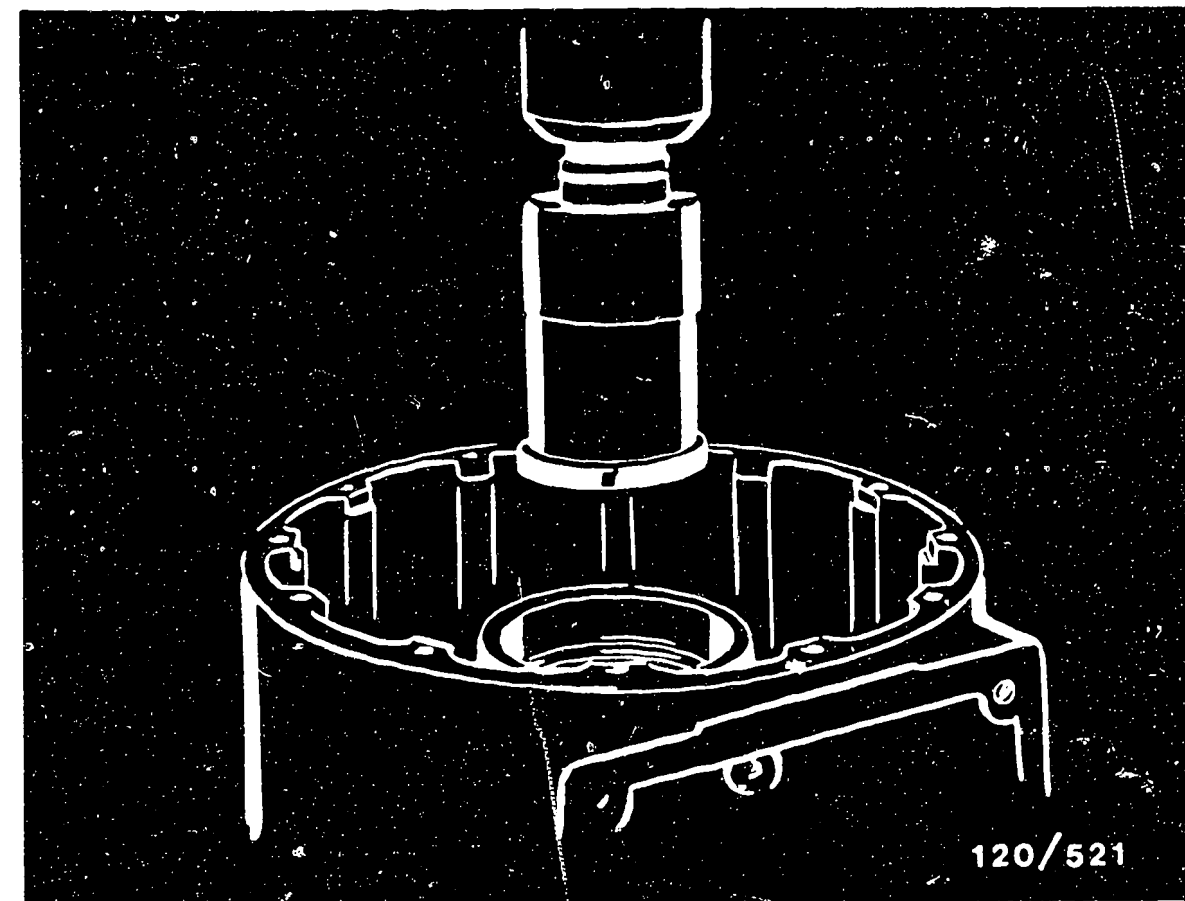


#### ASSEMBLING THE ALTERNATOR

Press the deep-groove ball bearing into the end shield on the collector ring side.

**ATTENTION:** Before pressing in the deep-groove ball bearing, the end shield or the ball-bearing seat must be heated to a temperature of approx. 80°C.

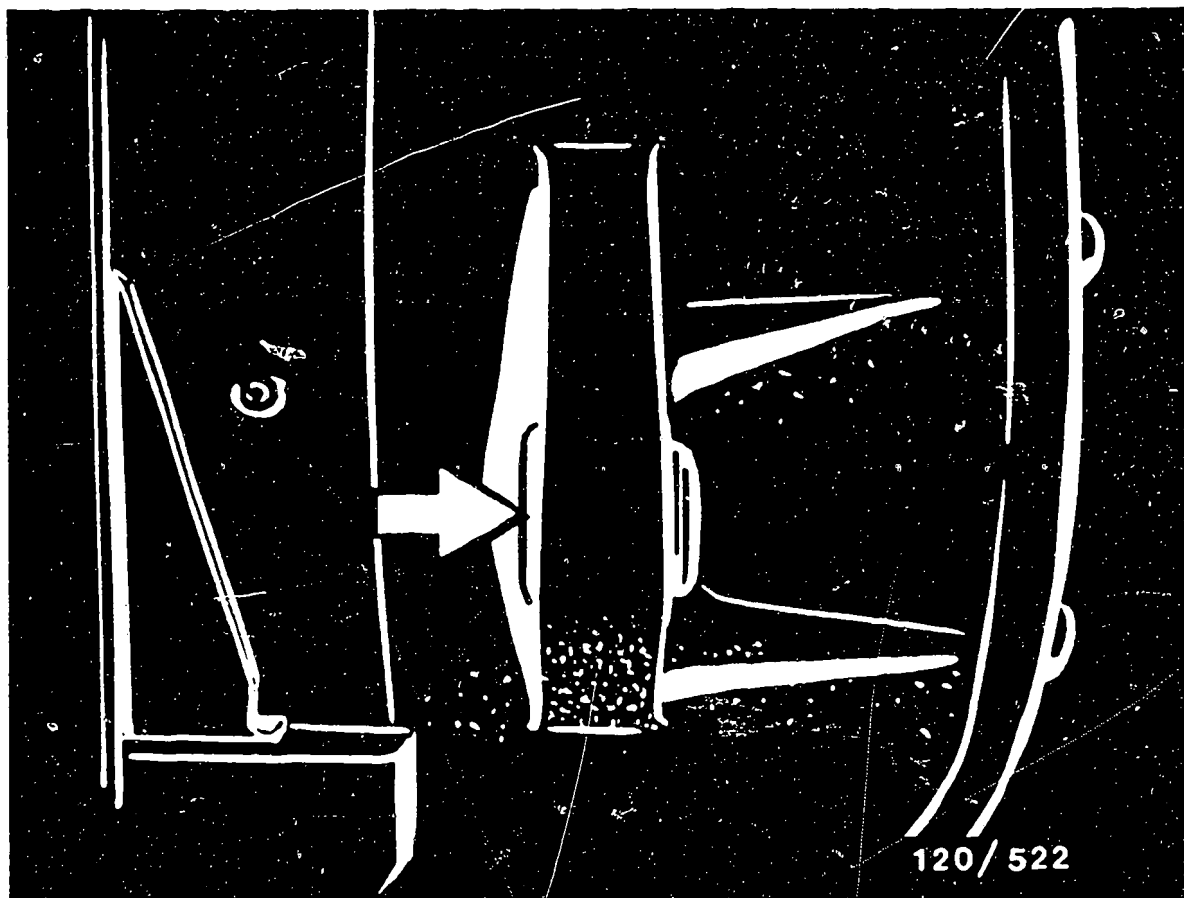
Mount the deep-groove ball bearing on to the press-in tool KDLI 6033 and press into the collector-ring end shield as far as it will go using the arbor as shown in the illustration.



#### PRESSING IN THE RADIAL SEAL

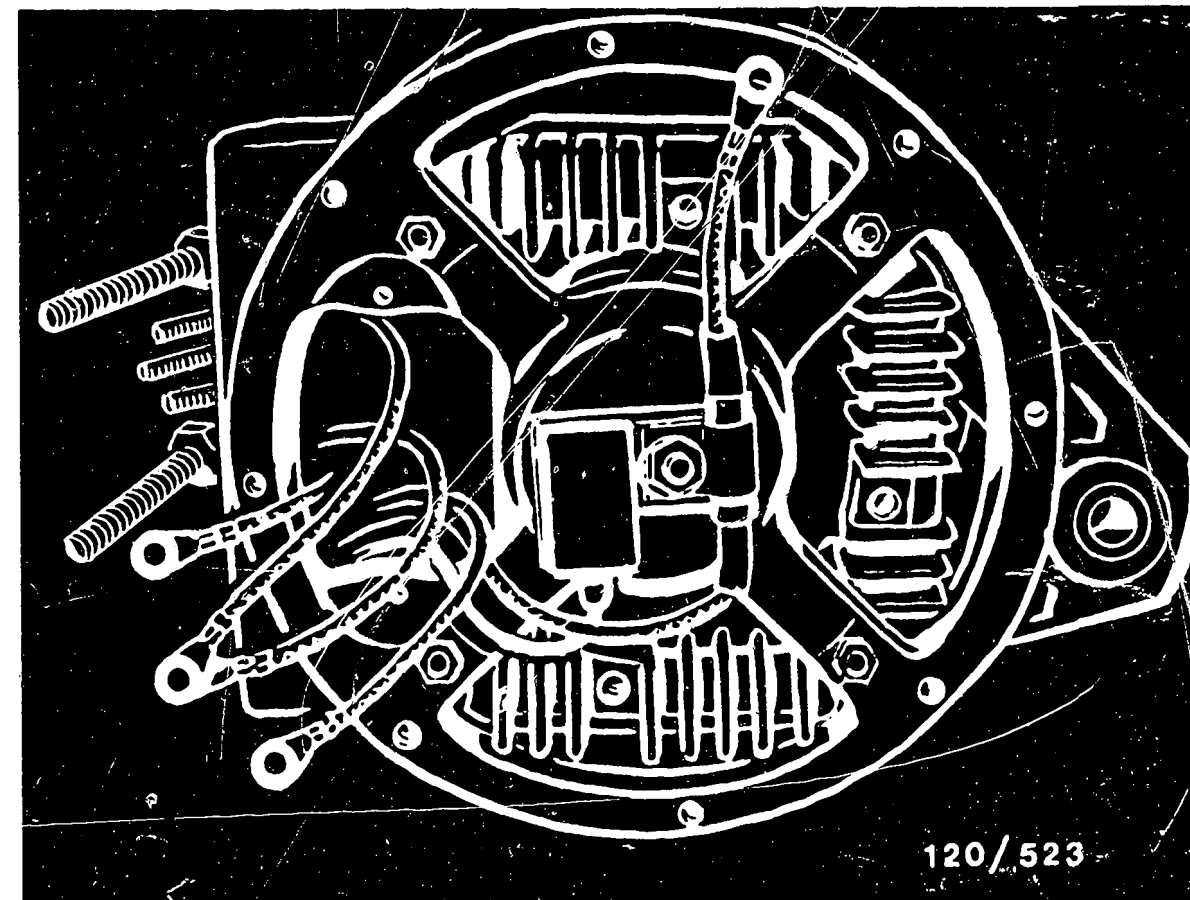
Mount the seal ring the right way round on to the press-in tool KDLI 6033 and press into the collector-ring end shield as shown in the illustration.

Depth for radial seal = flush with upper edge of the blind hole.



#### EXCHANGING THE SLIDING BUSHING

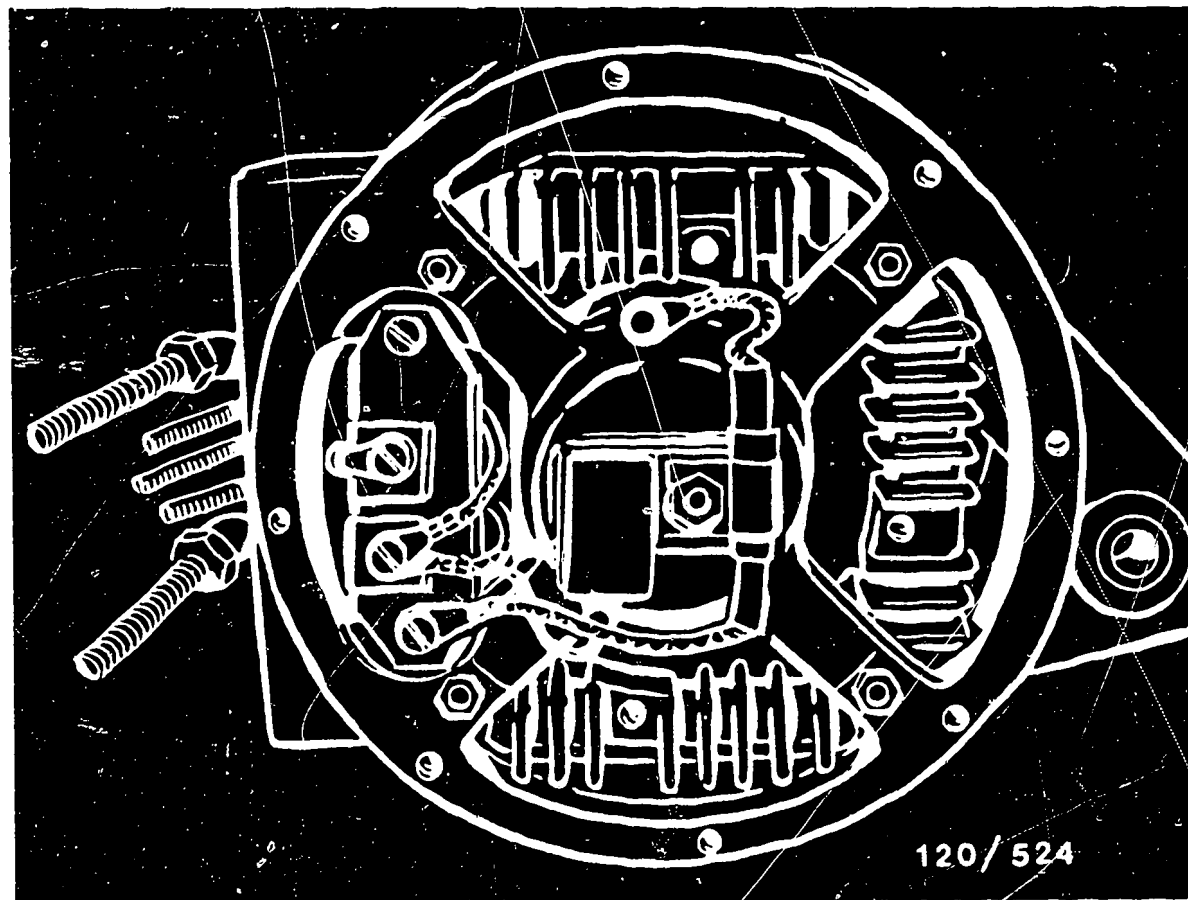
Position the collector-ring end-shield housing on to a suitable base (KDLI 6016) in such a way that the sliding bushing can be pressed in using KDLI 6015 so that it is flush with the left-hand side.



#### INSTALLING THE RECTIFIER

Introduce rectifier into the collector-ring end shield as shown in the illustration and secure with four nuts.

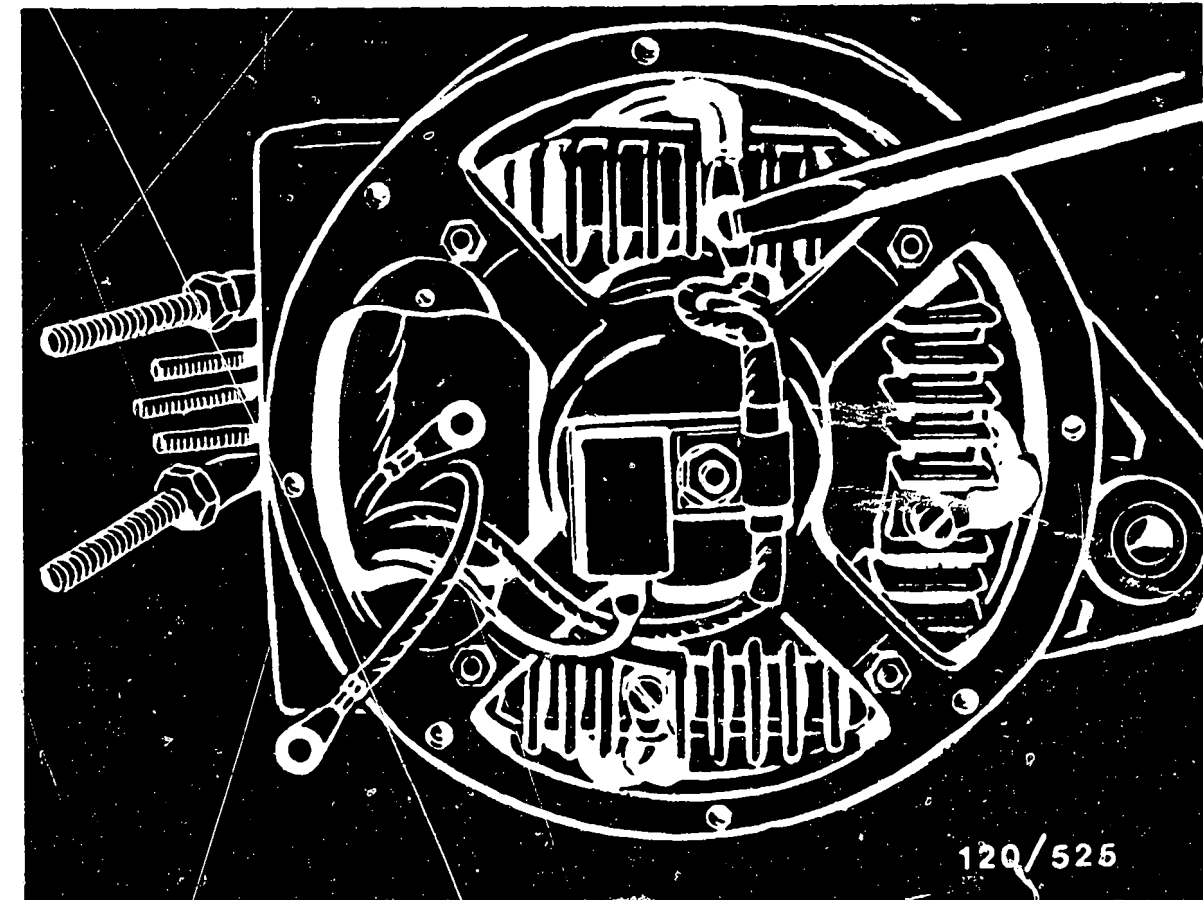
Tightening torque 2,4...3,2 Nm



#### FITTING THE CAPACITOR AND DAMPING RESISTOR

Secure the capacitor and damping resistor to a common fastening screw and tighten to the specified torque.

Tightening torque 4,1...5,5 Nm

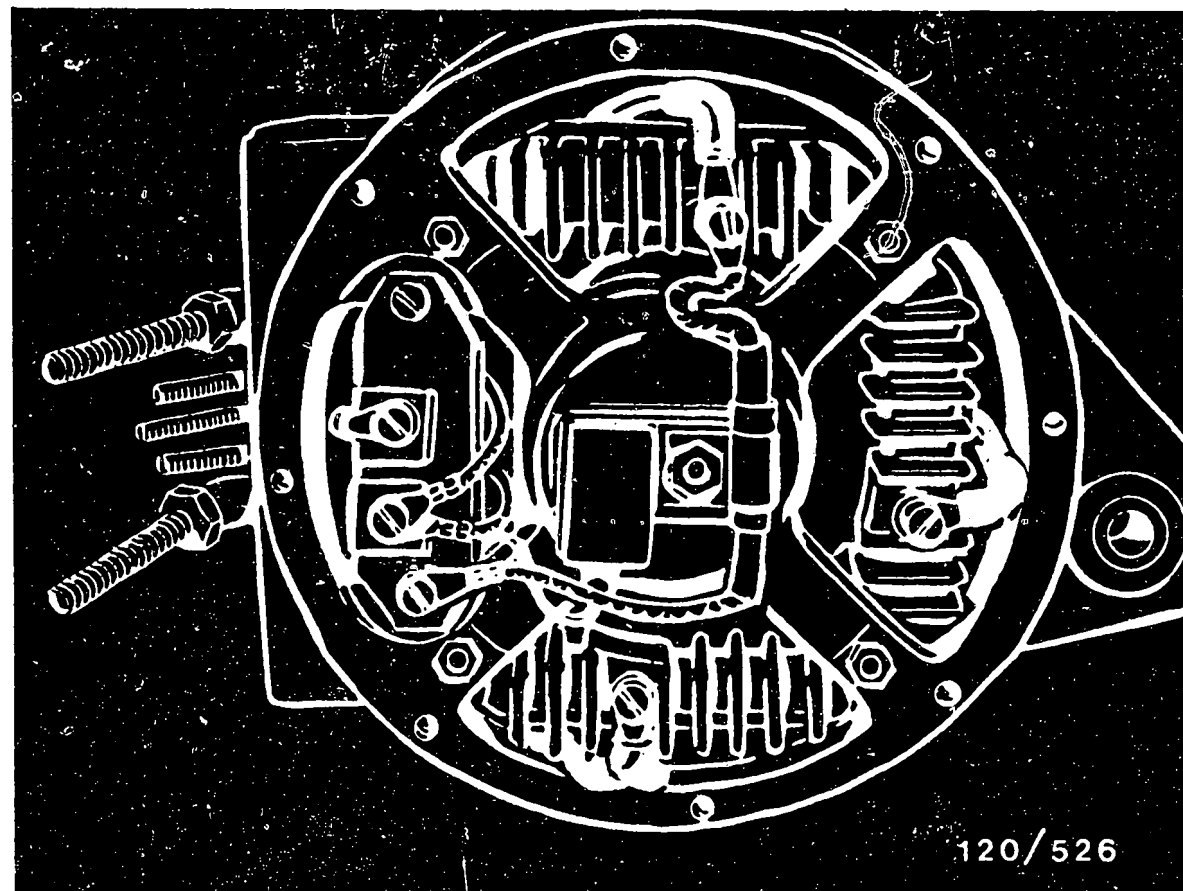


#### ASSEMBLING THE STATOR AND COLLECTOR-RING END SHIELD

Bring the markings on the collector-ring end shield and stator into alignment and push the stator connections through the dots in the direction of the collector-ring end shield and secure at the rectifier to the specified tightening torque.

Tightening torque 4,9...6,6 Nm

After assembling, secure the screws with locking paint and protect (epoxy-resin paint).



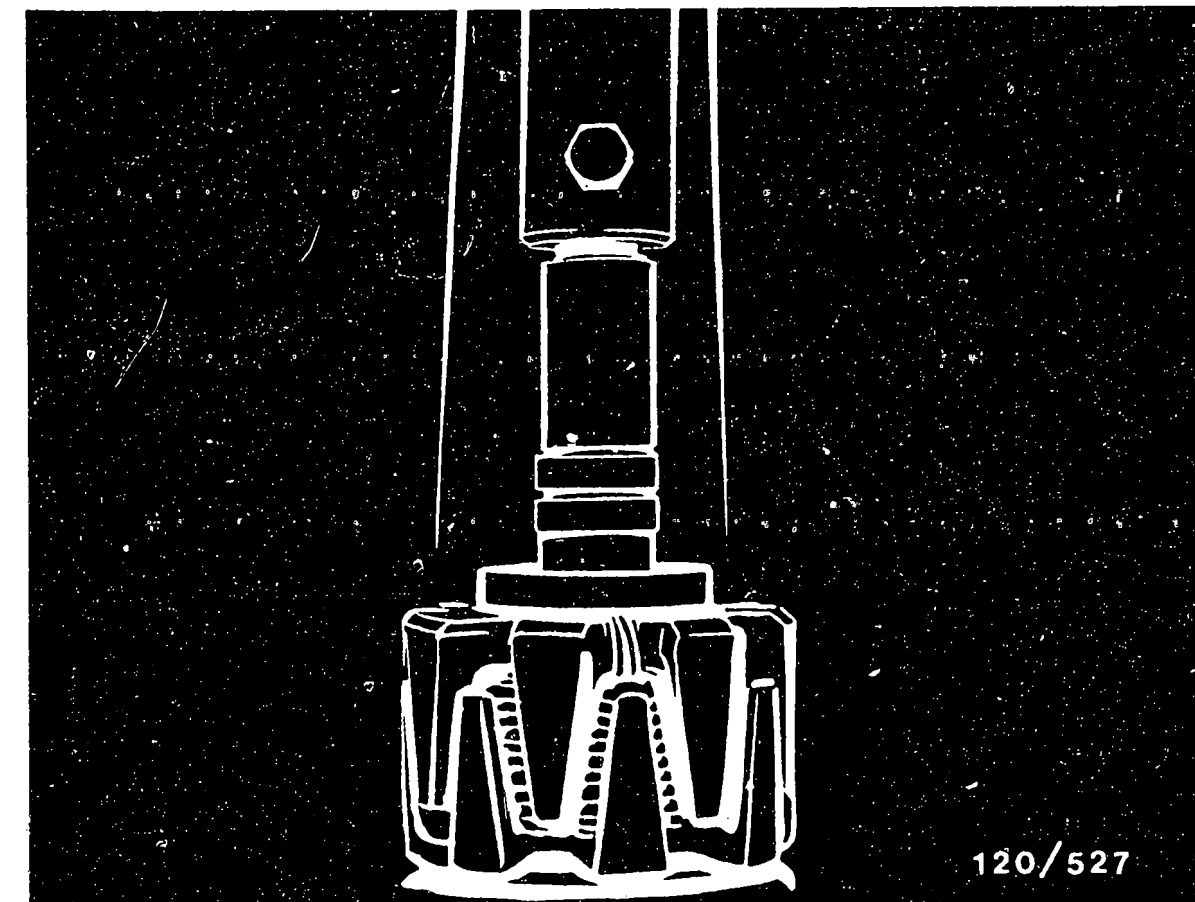
#### INSTALLING THE REGULATOR

Position the regulator on the collector-ring end shield as shown in the illustration and tighten the fastening screws and line connections to the specified torques and secure with epoxy-resin paint.

#### Tightening torques:

Regulator mounting	1,2...1,6 Nm
Connection DF2 on regulator (M5)	2,4...3,2 Nm
Connection D+ on regulator (M4)	1,2...1,6 Nm

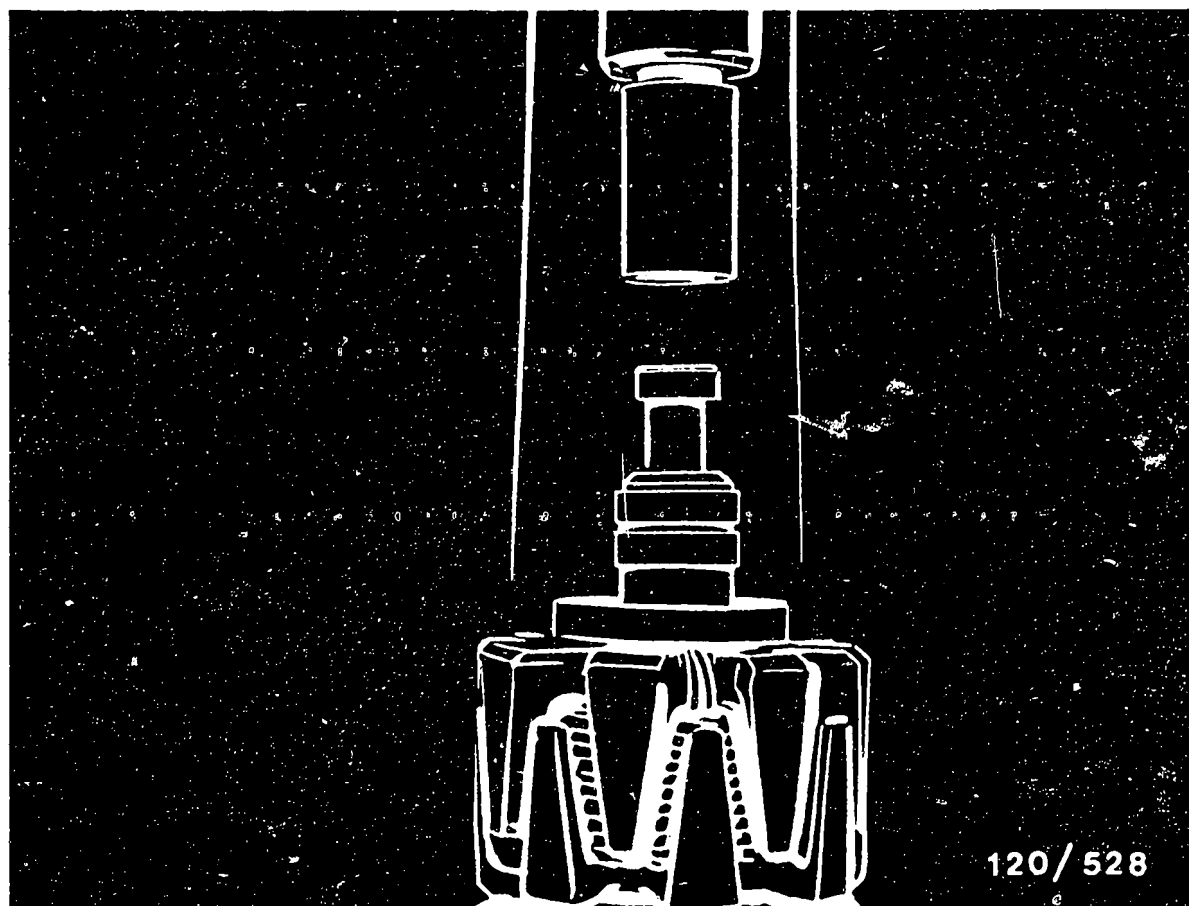
Attention: Do not mix up connections at regulator.



#### PRESSING ON THE COLLECTOR RINGS

Position rotor on the arbor press.

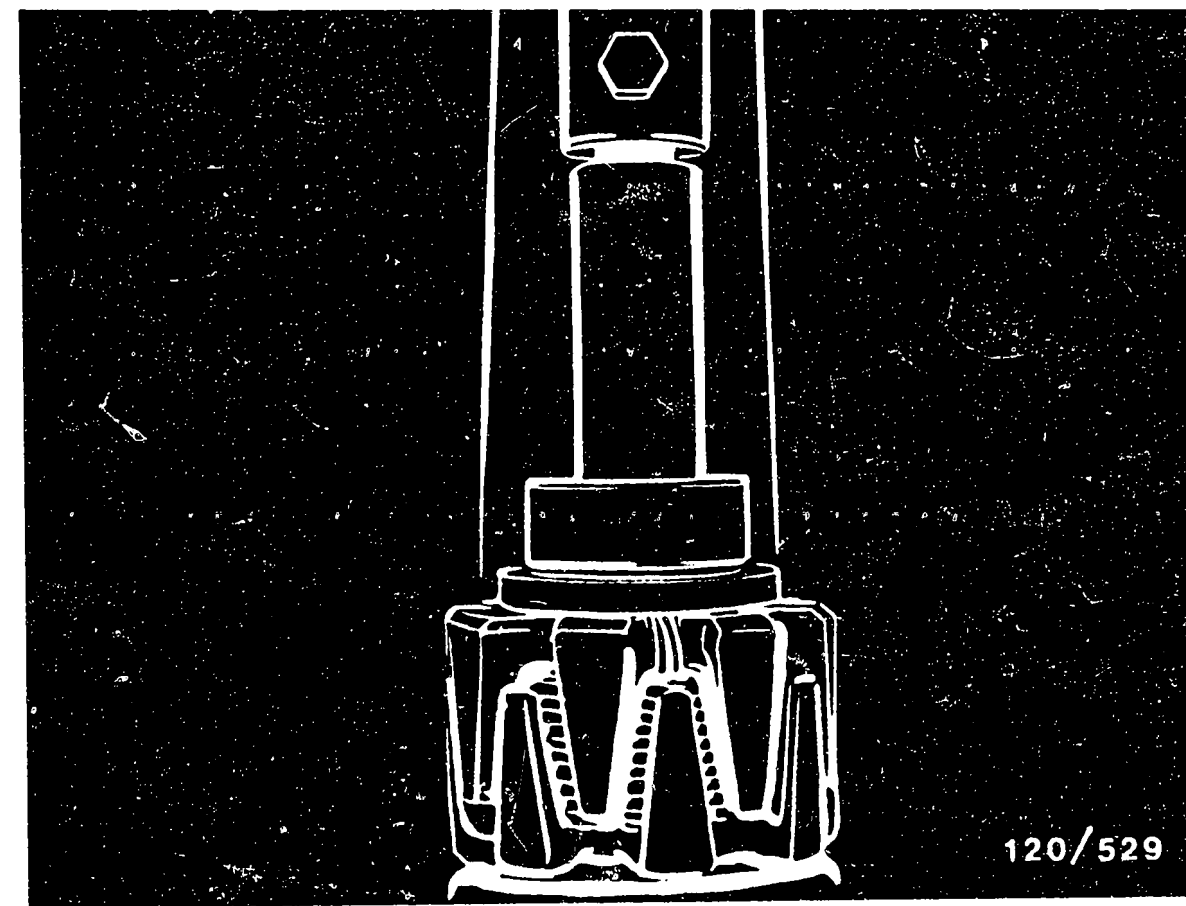
Push collector rings on to the rotor shaft and using the press-in tool KDLI 6035 push as far as they will go. Solder wire ends of the excitation winding.



PRESSING ON SUPPORT RING AND CYLINDRICAL-ROLLER-BEARING INNER RACE

Position support ring on to the rotor shaft and press on as far as it will go using the press-on tool KDLI 6035.

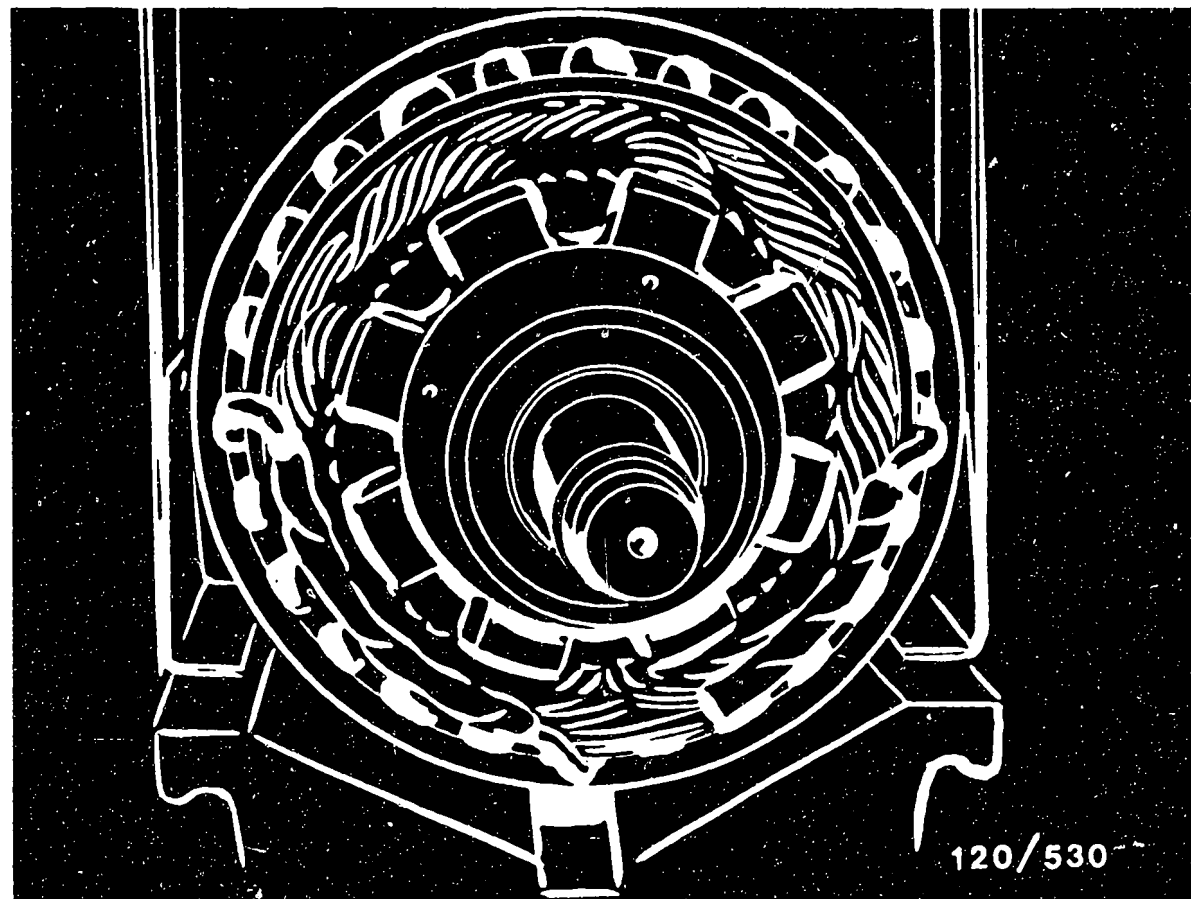
Position cylindrical-roll-bearing inner race on to the rotor shaft and press as far as it will go on the support ring likewise using the press-on tool KDLI 6035.



PRESSING ON THE CYLINDRICAL-ROLLER BEARING (DRIVE SIDE)

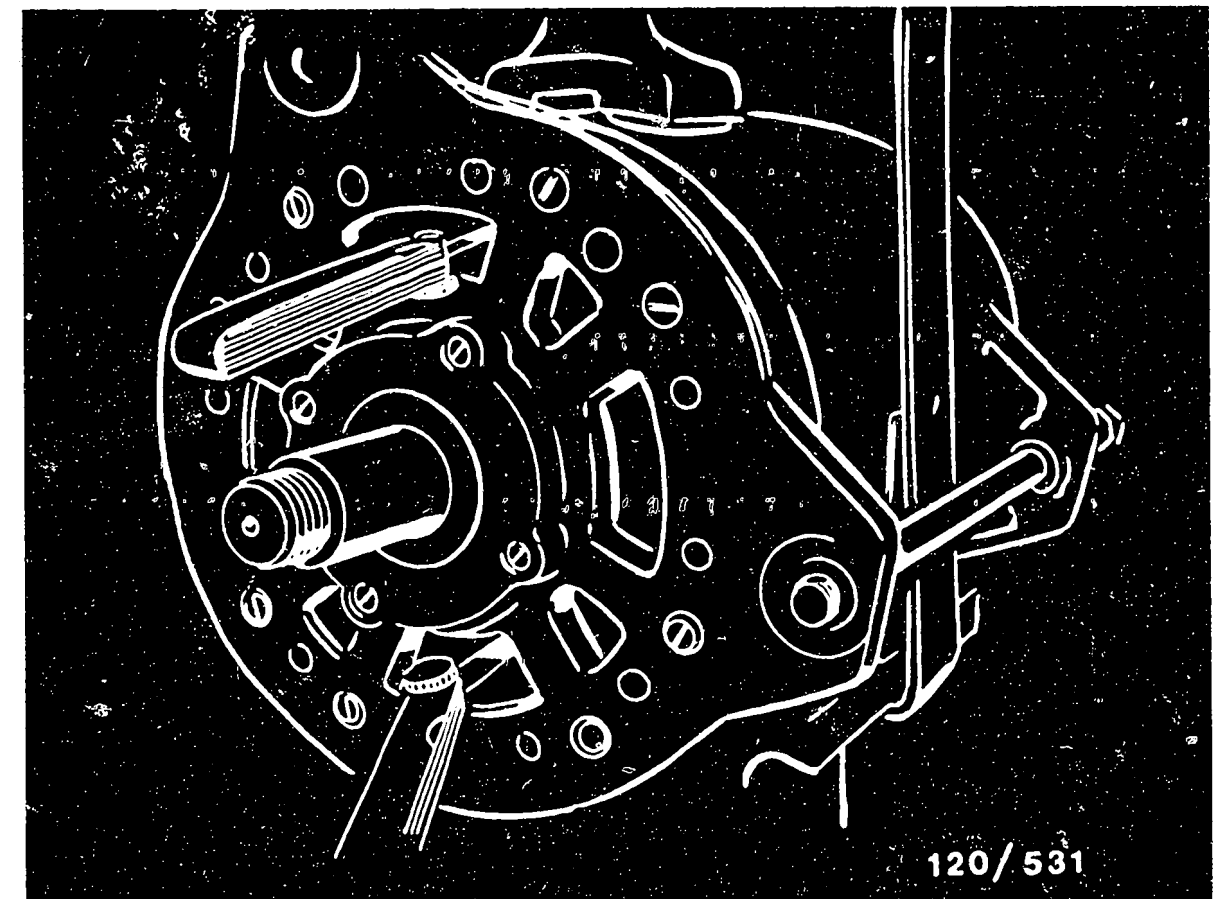
Position holding disc the right way round on to the rotor shaft (deep groove makes contact with the recess of the claw-pole halves).

Mount deep-groove ball bearing on to the rotor shaft and press on as far as it will go using press-on tool KDLI 6021.



#### INSTALLING THE ROTOR

Insert rotor into the alternator carefully so that the radial seal in the collector-ring end shield is not damaged.



#### MOUNTING THE DRIVE-END-BEARING HOUSING

Immerse the front threads of all the fastening screws of the drive-end-bearing housing into Molykote paste Ft70v1.

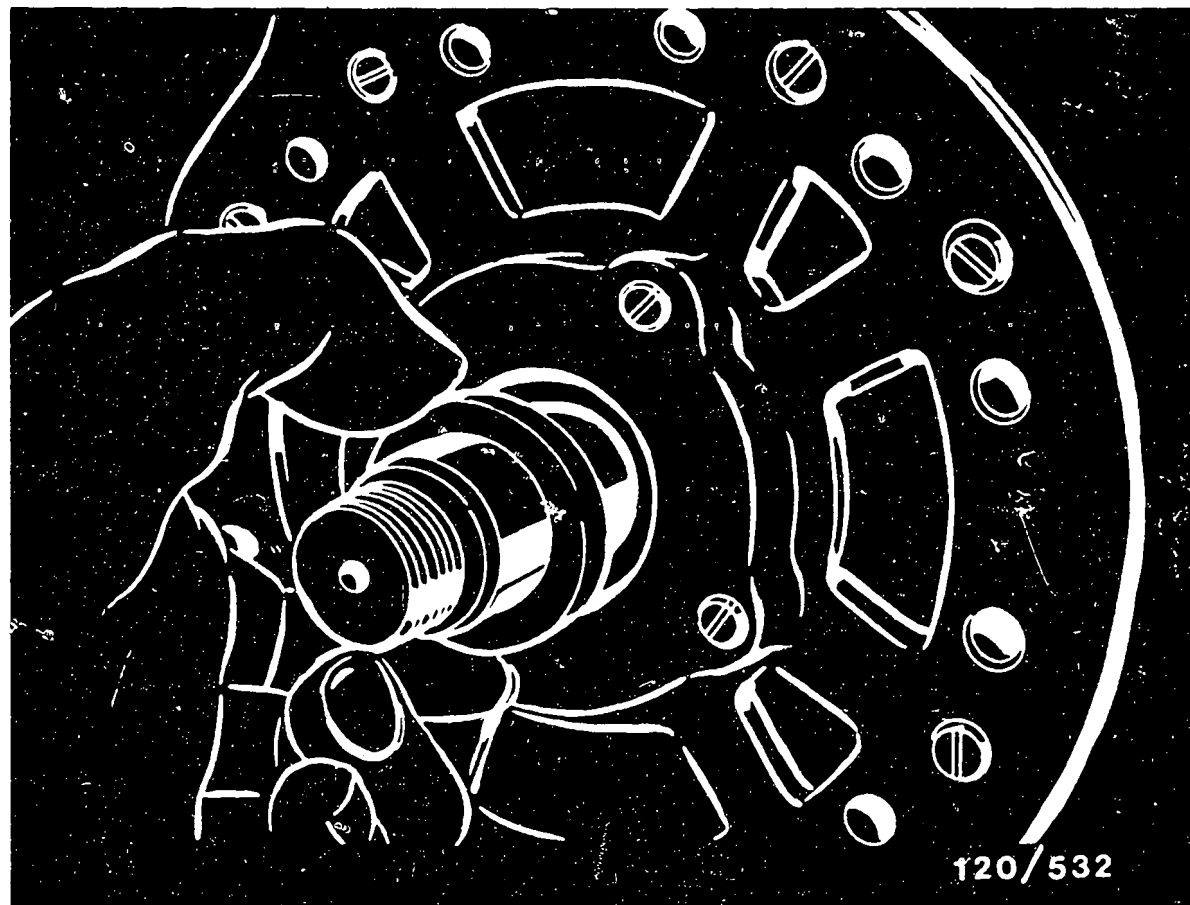
Bring the markings on the drive-end-bearing housing and on the stator into alignment and locate with 2 screws (see illustration). In order that the swivel arm and the drive-end-bearing housing align, use bolt KDLI 6014 as a gauge.

Connect supporting plate and drive-end-bearing housing with 4 screws and tighten to the specified tightening torque.

Tightening torque 4,1...5,5 Nm

Afterwards, screw in the remaining 6 fastening screws and tighten to the specified tightening torque.

Tightening torque 7,2...9,7 Nm



#### MOUNTING THE FAN AND PULLEY

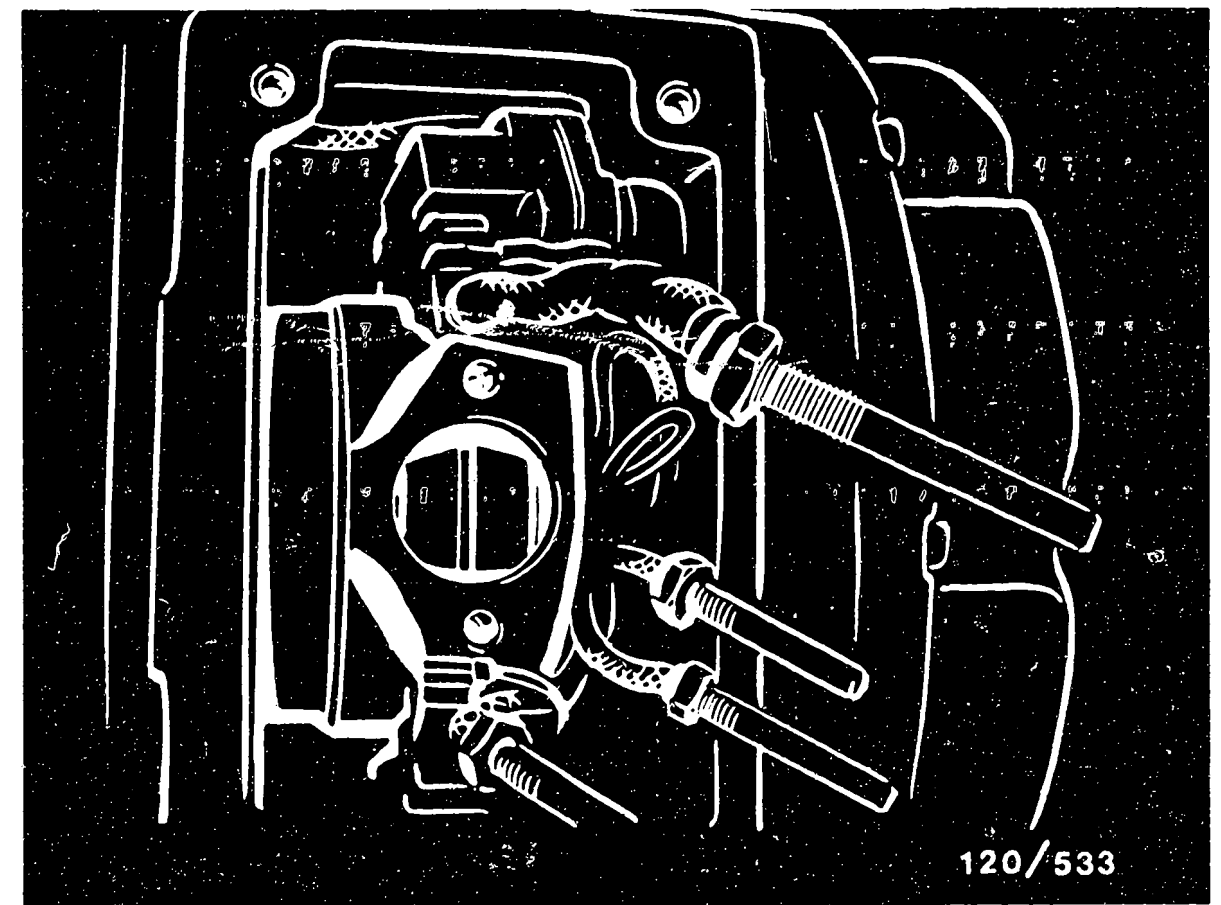
Push spacer ring over the rotor shaft.

Position fan the right way round.

Push on the pulley and do not forget the Woodruff key (taper key).

Using holding device KDLI 6006 and 36 mm A/F wrench, tighten the fastening nut to the specified tightening torque.

Tightening torque 120...150 Nm



#### INSTALLING THE CARBON-BRUSH HOLDER

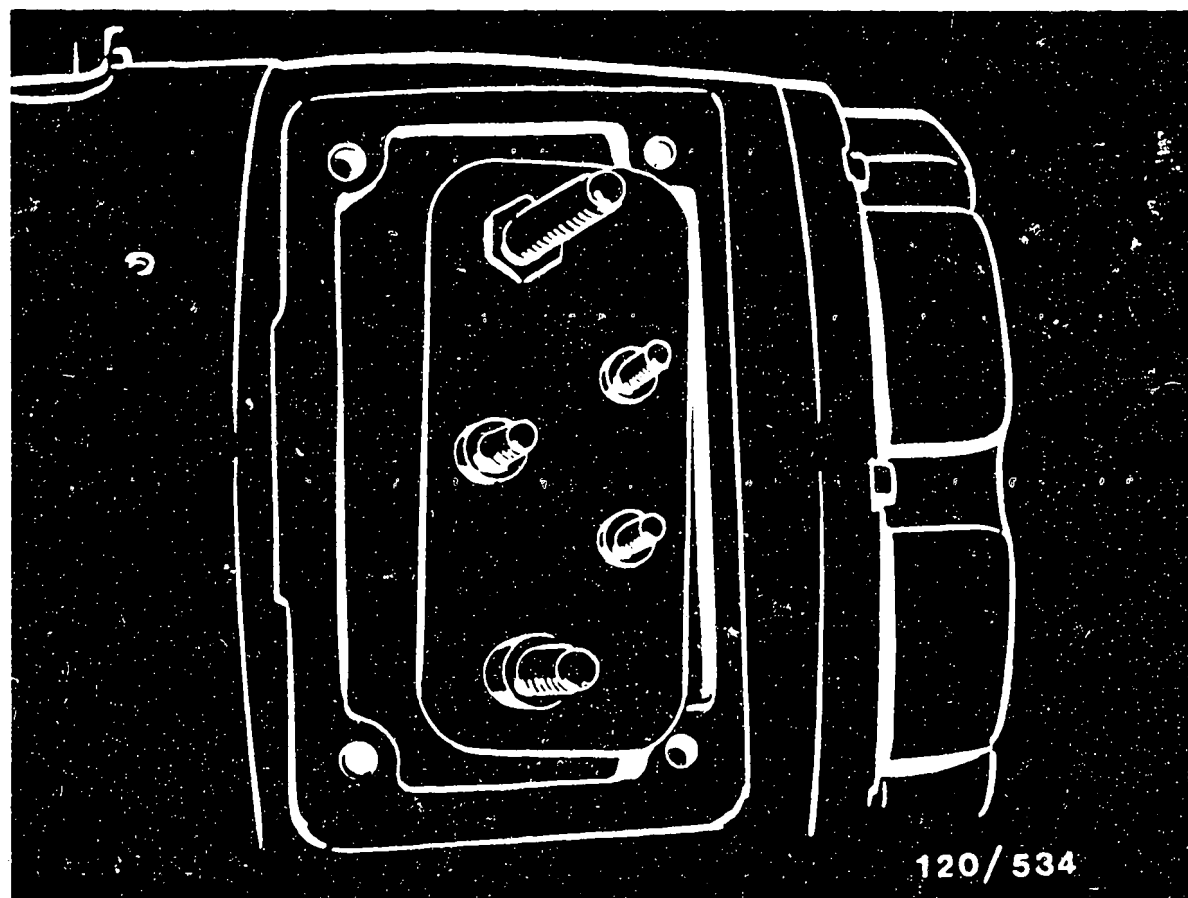
Insert carbon-brush holder with new carbon brushes into the housing and secure with 2 fillister-head screws.

Tightening torque 2,8...3,6 Nm

Connect the marked (identified) electrical terminals to the carbon-brush holder in accordance with the circuit diagram and tighten the fastening nuts. Secure the electrical terminals with epoxy-resin paint.

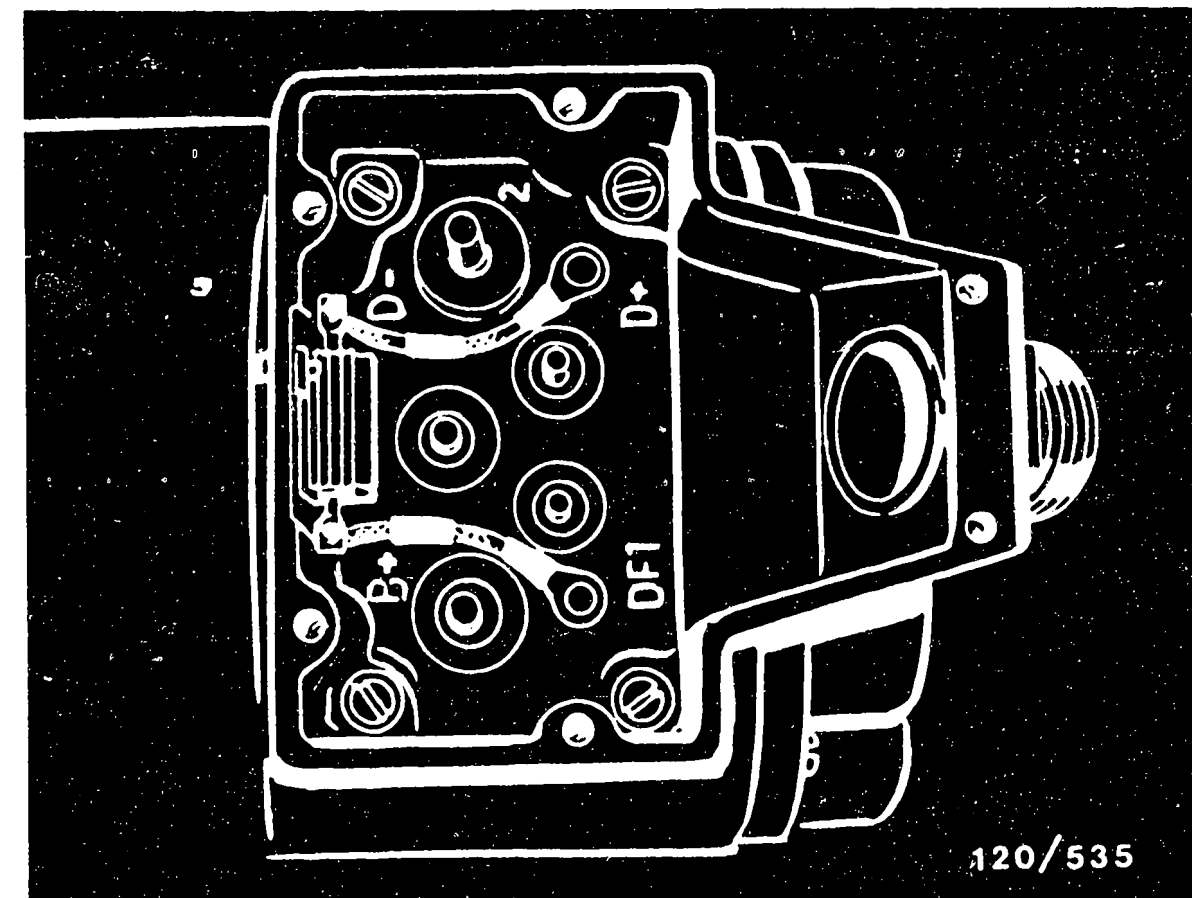
Tightening torque 1,0...1,4 Nm





# INSERTING THE INSULATING PLATE

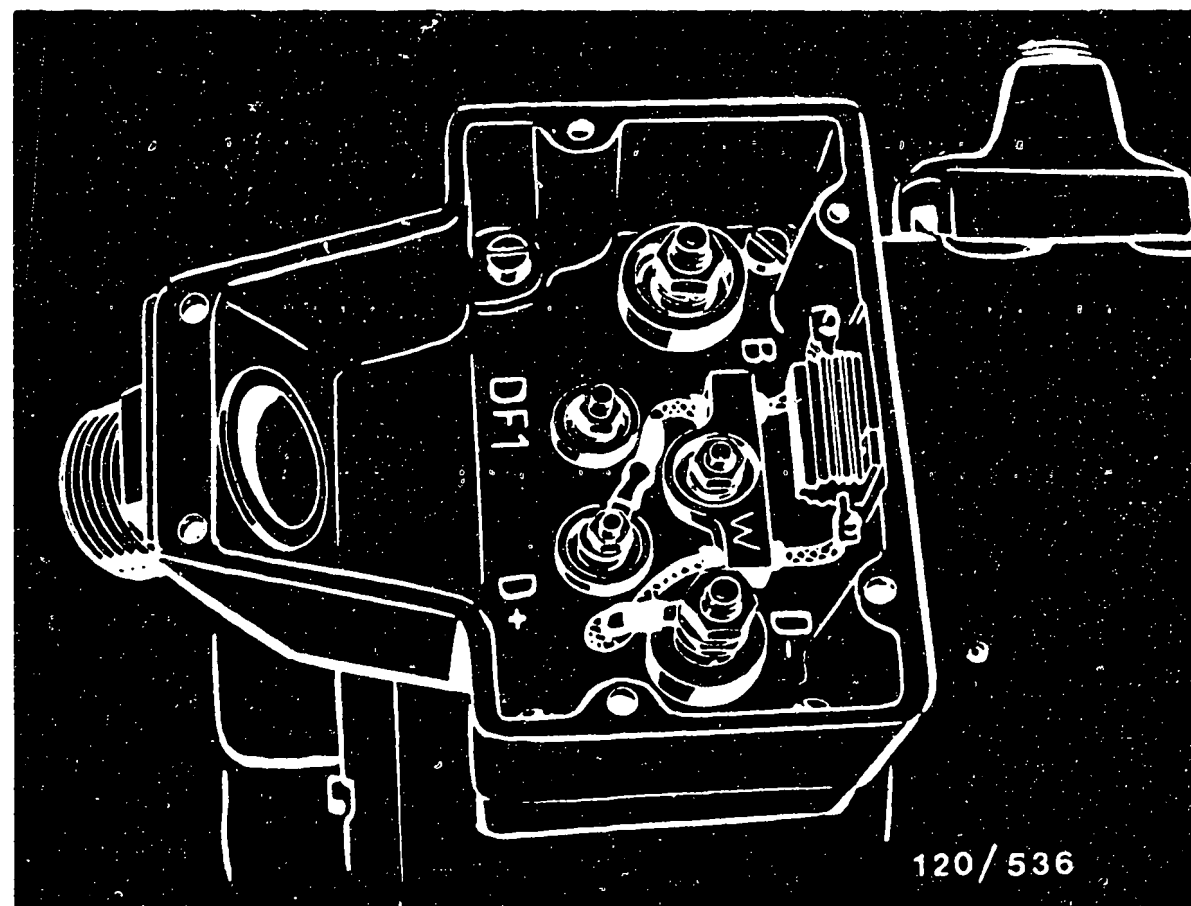
Insert the insulating plate in such a way that the terminals B+, W, D-, DF1 and D+ can be pushed through from the alternator without any twists in the cables (see illustration).



# SECURING THE CONNECTION HOUSING

Position connection housing the right way round, as shown in the illustration, on to the studs which poke through the insulating plate, and tighten with 4 fillister-head screws.

Tightening torque 7,2...9,7 Nm



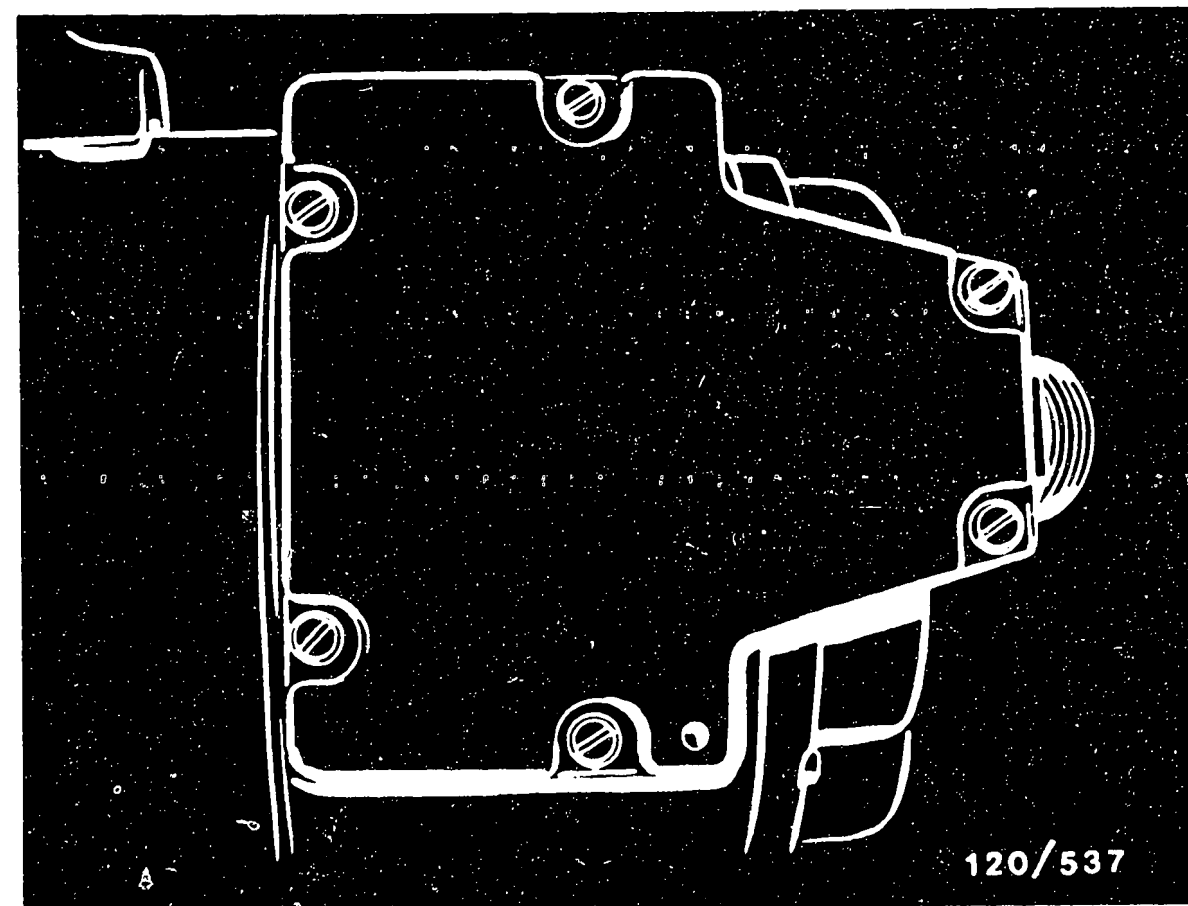
#### TIGHTENING THE TERMINAL STUDS

Position the plain washers, spring washers, and insulating caps over the terminal studs as shown in the exploded view, and tighten with the hexagonal nuts to the specified torque.

#### Tightening torques:

B+	lower / upper nut	10...13/3,2...3,5 Nm
D-	lower / upper nut	10...13/3,2...3,5 Nm
	center nut	10...13 Nm
D+	lower / upper nut	2,8...3,6/2,2...2,8 Nm
	center nut	2,8...3,6 Nm
DF1	lower / upper nut	2,8...3,6/0,9...1,2 Nm
	center nut	2,2...2,8 Nm
W	lower / upper nut	4,9...6,6/1,4...1,7 Nm

Note on assembly: first of all mount the resistor in the connection housing and then the electric terminals to DF1 and D-.



#### MOUNTING THE HOUSING COVER

Position housing cover on to the terminal box and tighten with 6 fillister-head screws.

Tightening torque 0,9...1,2 Nm

## TESTING THE ALTERNATOR WITH REGULATOR ON TEST BENCH

## Test equipment and devices

Generator test bench	EFLI 91	0 683 300 100
----------------------	---------	---------------

**Alternator**

**tester**                      WPG 012.00     0 681 101 403

For additional test:

## Ignition oscilloscope (All versions)

or

**Bosch Motortester** (All versions)

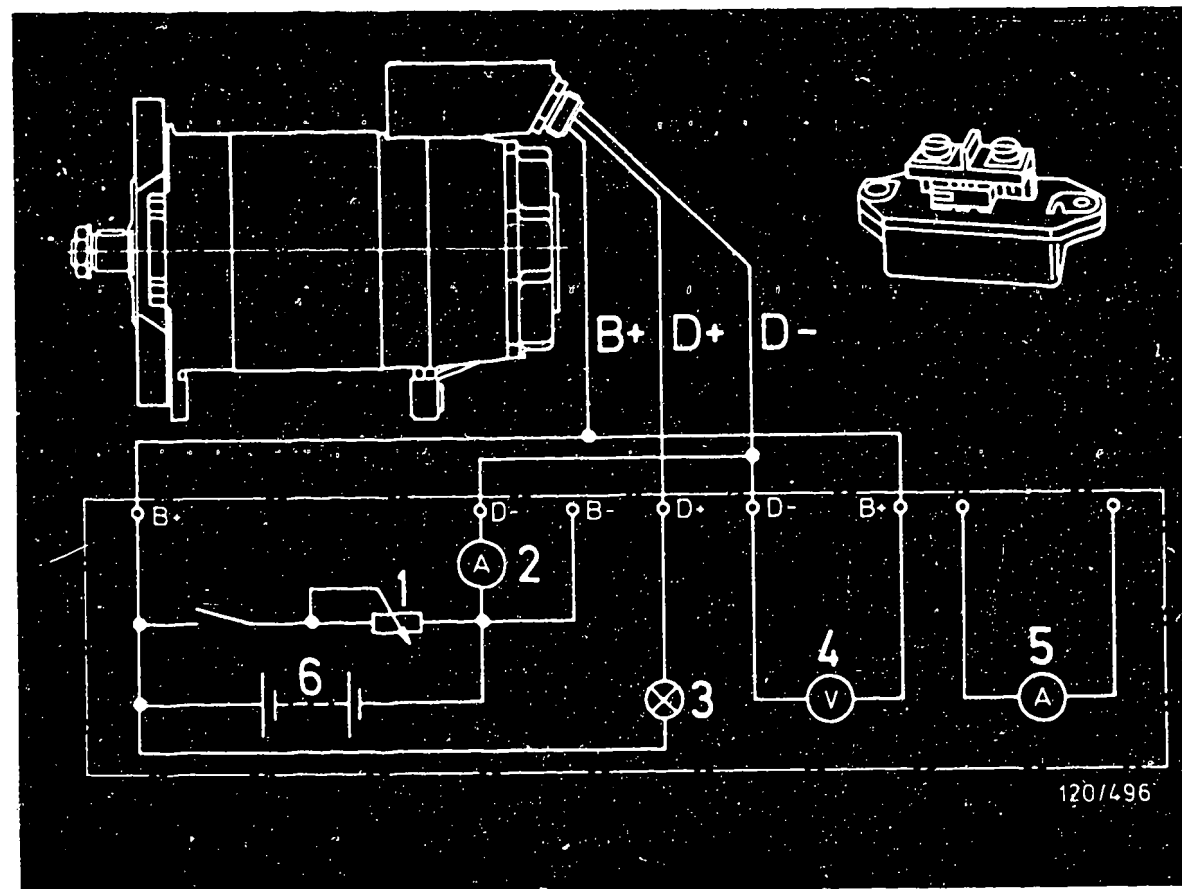
### Mounting on the test bench

Swivel-arm-mounted alternators must be mounted on the test bench using only the appropriate clamping fixture.

**N o t e :**

If, at very high alternator outputs, the drive power of the test bench motor is not sufficient, then only carry out the test to the extent that the test voltage of 26 V does not drop at the required test current.

The charge indicator lamp must be completely out when power testing.



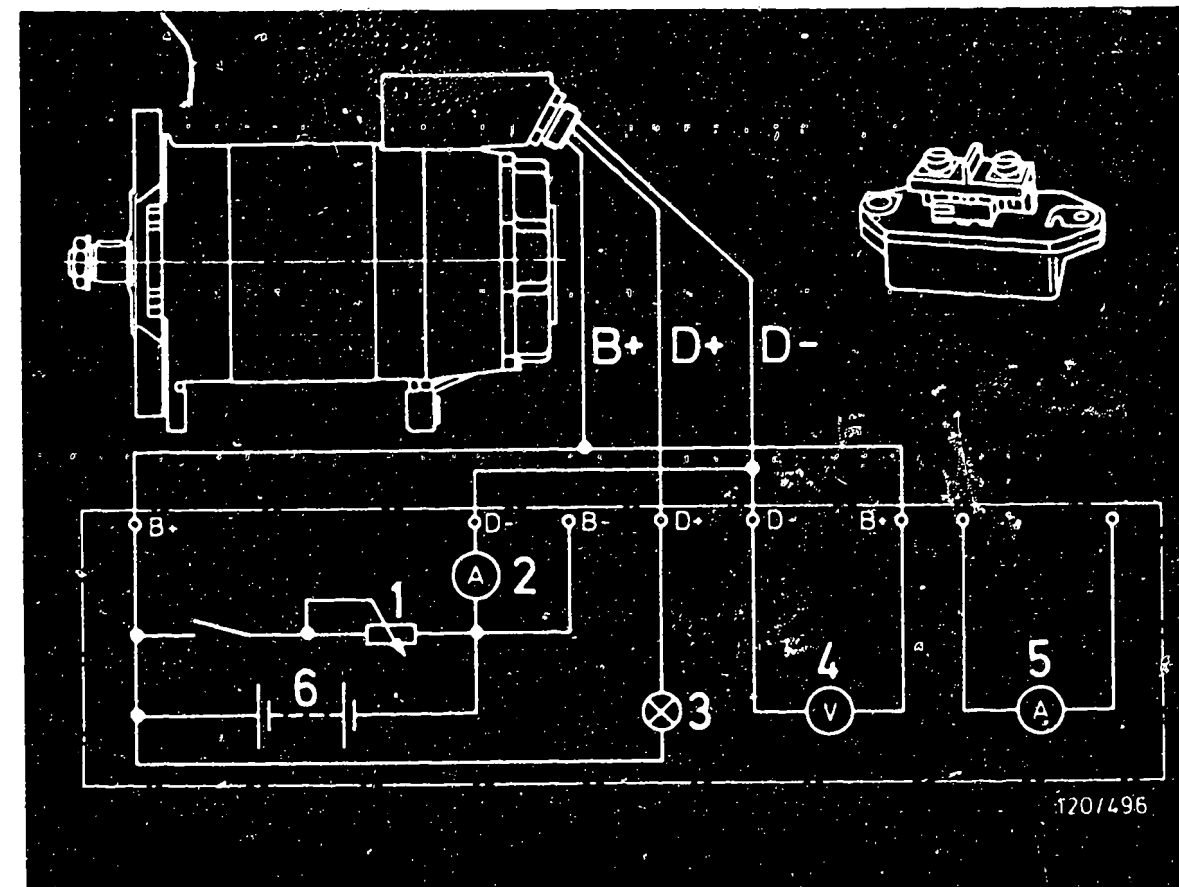
- 1 = Loading resistor
- 2 = Ammeter
- 3 = Indicator lamp
- 4 = Voltmeter (regulated voltage)
- 5 = Ammeter
- 6 = Test-bench battery

#### Connecting the alternator to the test bench

Connect the positive battery cable of the test bench to B + of the alternator.

Connect the negative battery cable of the test bench directly to the alternator.

Connect voltmeter between B + and B -.



- 1 = Loading resistor
- 2 = Ammeter
- 3 = Indicator lamp
- 4 = Voltmeter (regulated voltage)
- 5 = Ammeter
- 6 = Test-bench battery

#### Important:

All connections on the test bench must be properly made.

When testing without the subsequent-damage preventer, make a bridge from D+ to DF1.

When the alternator is running, the connection between alternator and battery must not be disconnected since, otherwise, the semiconductors in the alternator and regulator may be destroyed. Do not operate the alternator without the battery being connected.

If a direction of rotation is marked on the fan wheel or on the alternator, then the alternator must be driven only in this direction of rotation.

POWER TESTING

Note:  
When power testing, ensure that the current-limiting resistor built into the test bench is not connected into the circuit since, otherwise, the charge indicator lamp glows and gives the impression that there is a fault in the alternator.

- \* For testing the alternator with regulator, set regulated voltage of regulator to 26 V.
- \* Run the alternator on the test bench at a speed of 1500 min<sup>-1</sup> for 30 minutes. Generator must be at normal operating temperature (approx. 60°C) for testing.

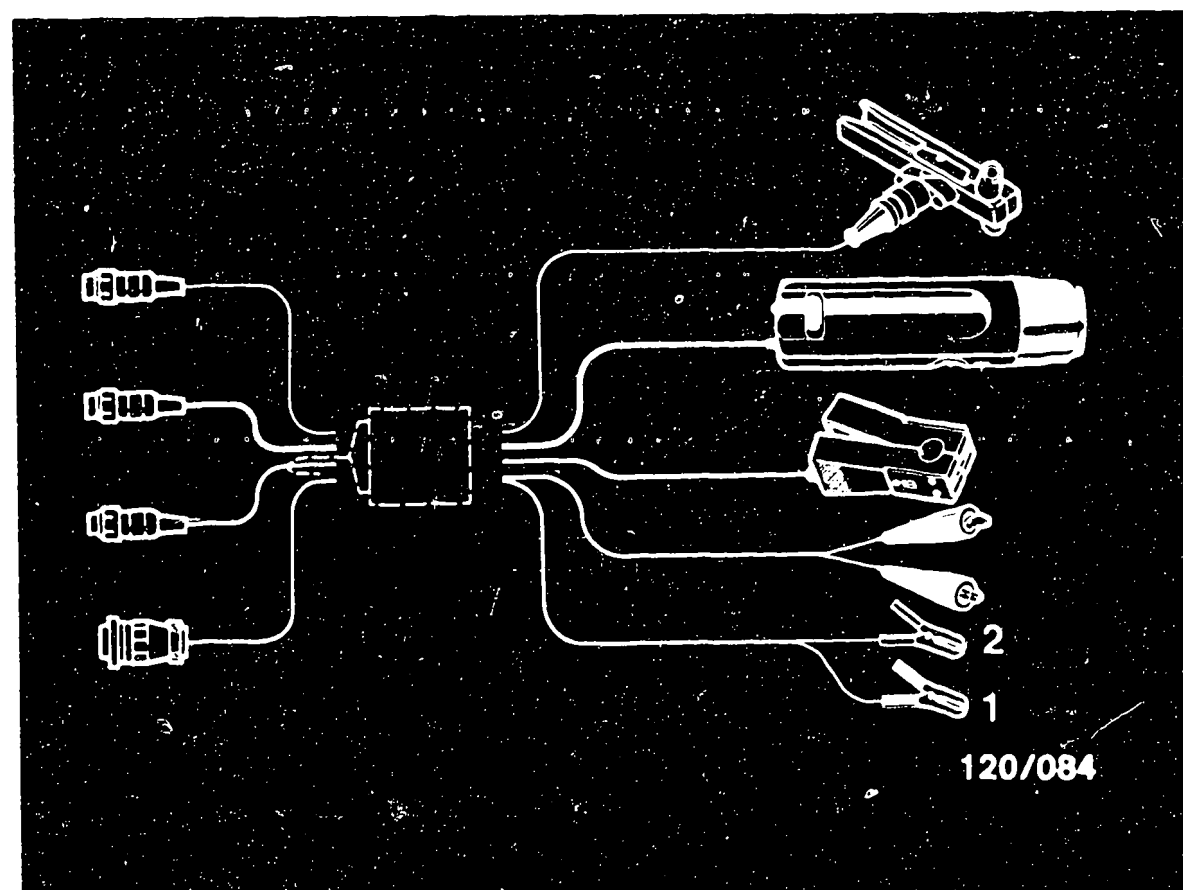
Alternators	Power test with regulator		Resistance values Ω + 10%	
	min <sup>-1</sup>	(A)	Stator	Rotor
0 120 689 ...				
T1-28V110/180A	1500 6000	110 180	0.1	7.5

After completion of the test, run the alternator once at a speed of 7000 min<sup>-1</sup>. This is to test whether the alternator stands up to this mechanically.

TESTING THE REGULATED VOLTAGE

Loading current = < 10A

Regulator part number	Type code	Regulated voltage V
0 192 053 024	EE 28 V3	27.6...28.4

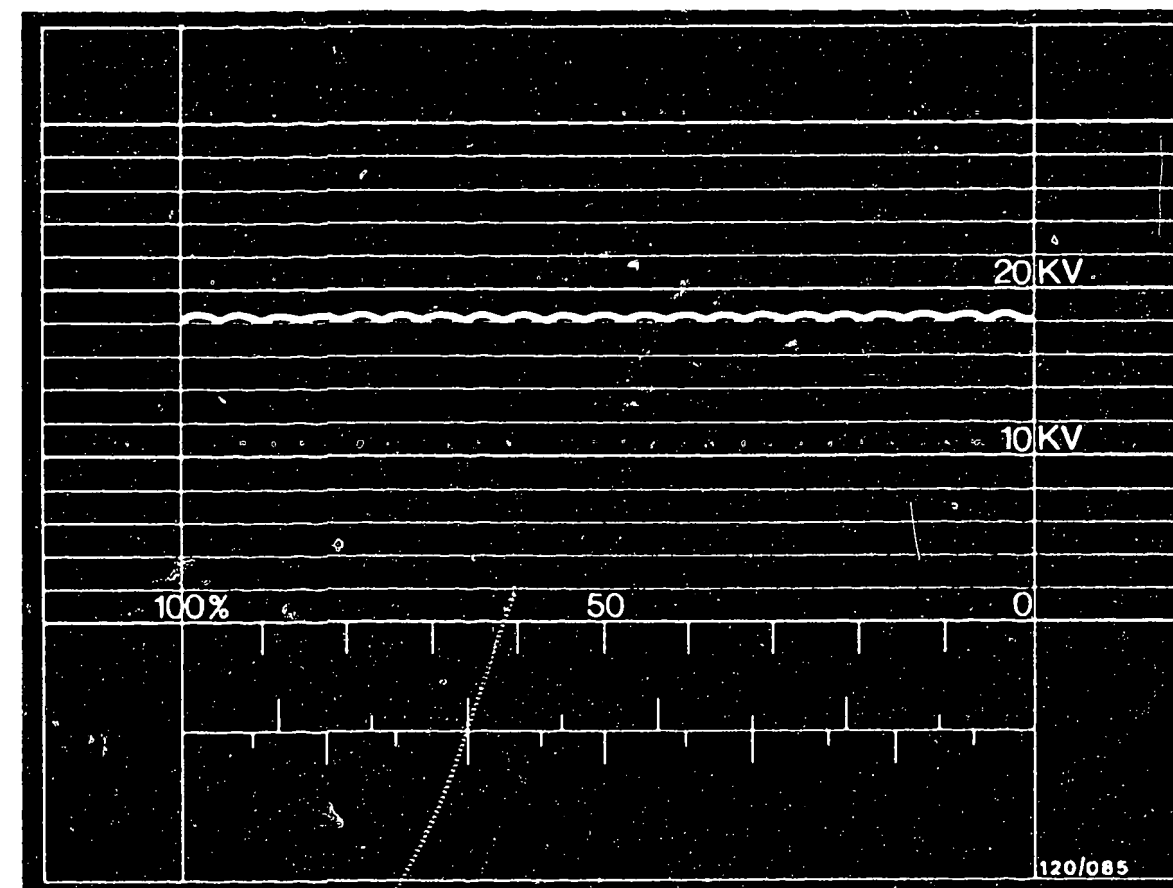


### TESTING WITH THE OSCILLOSCOPE

Connect oscilloscope (MOT 002.00) to the alternator using the corresponding test lead.

Red clip (1) to terminal D +.

Black clip (2) to terminal B - (ground).



Oscilloscope display O.K.:

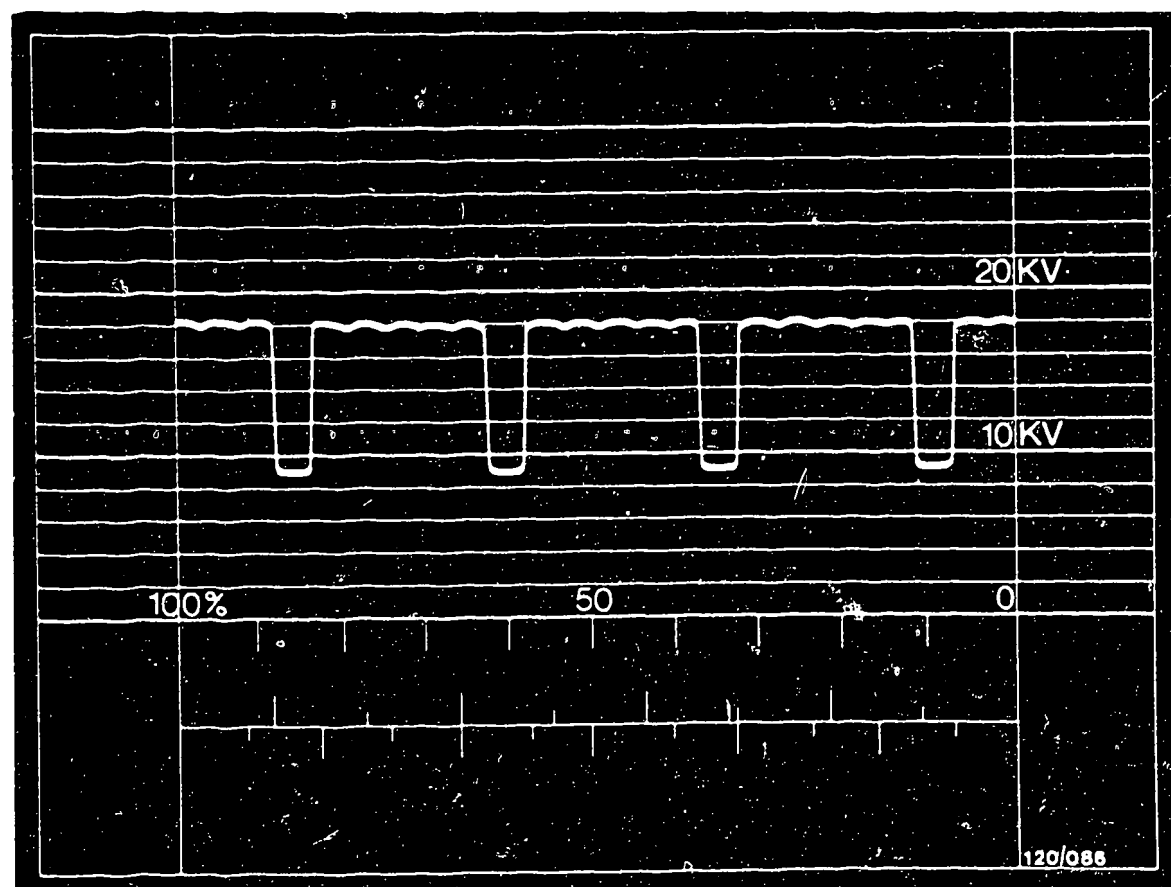
If the alternator is O.K., the above oscilloscope pattern will be displayed. The DC output has a slight ripple.

The pattern can exhibit small peaks when the voltage regulator comes into operation. The regulator can be stopped by means of switching in modes (e.g. load resistor).

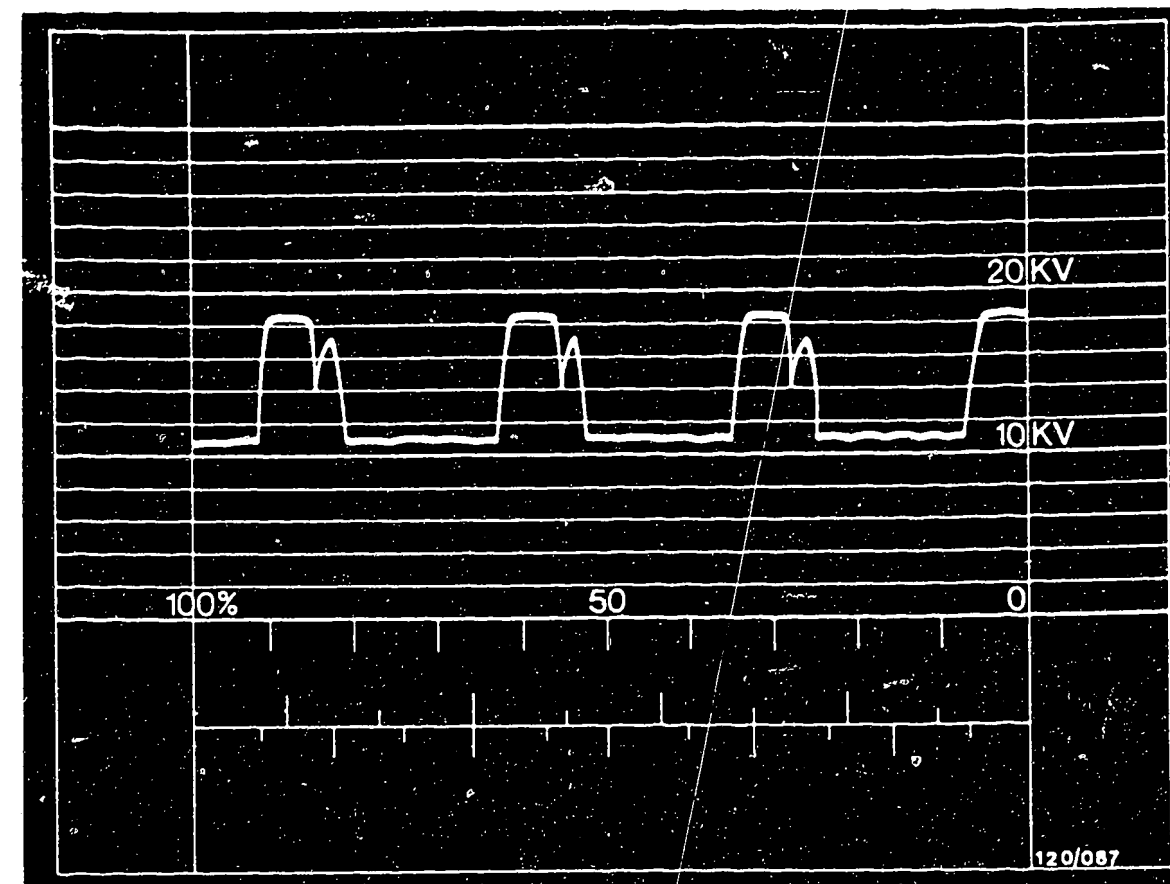
Adjust the pattern heights so that the ripple is contained between two adjacent kV lines.

In order to be able to compare such patterns, the pattern concerned is to be adjusted with the vertical control of the oscilloscope so that it fits approximately between the 10 kV and 20 kV lines.

N o t e : More than one defect can be present at one time.

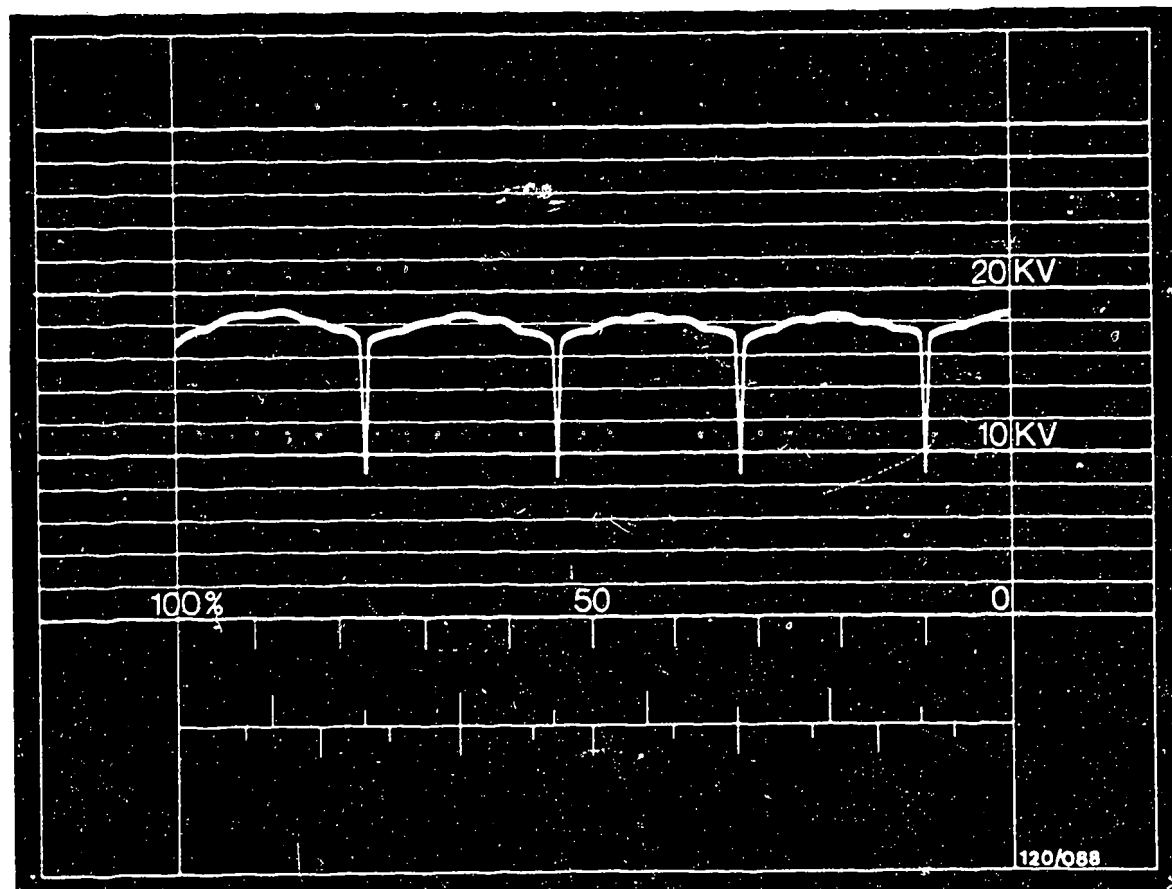


Oscilloscope display shows open circuit in an exciter diode.



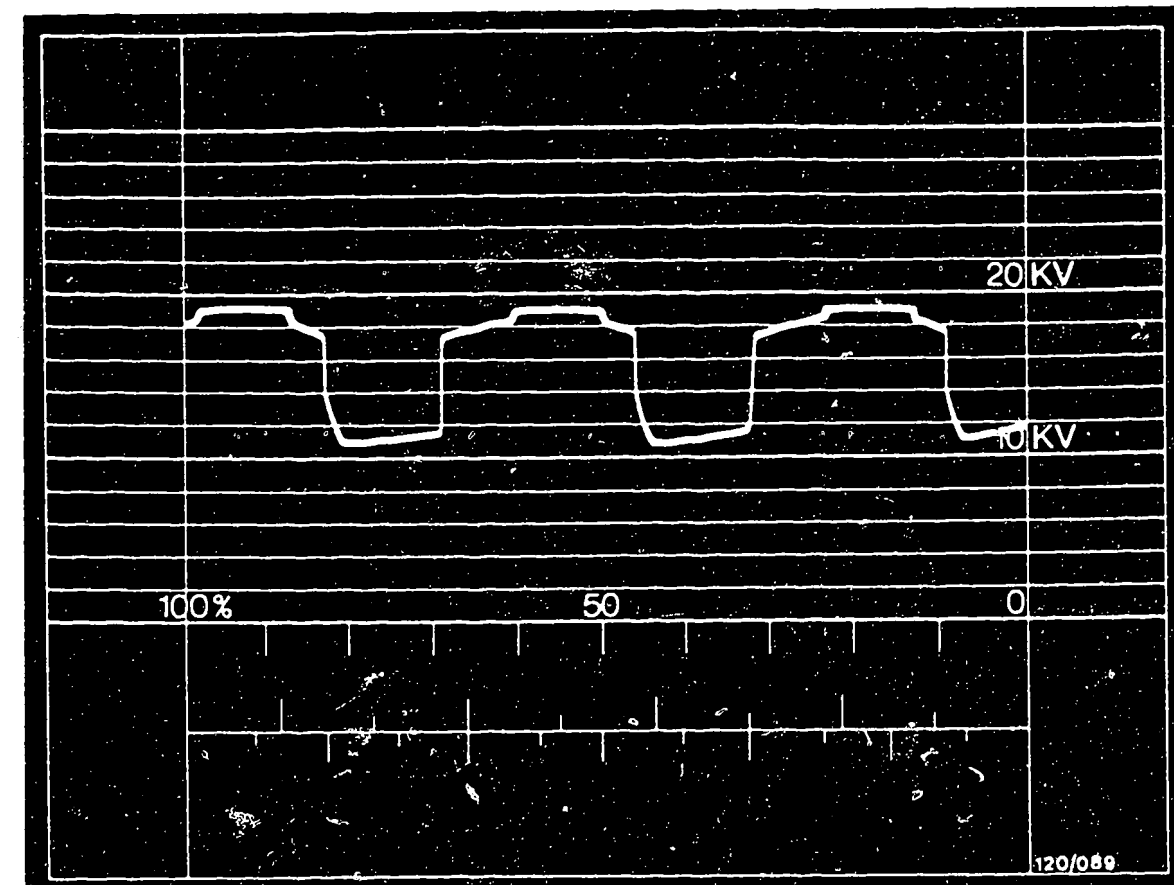
Oscilloscope shows open circuit in a positive diode.

If, on the alternator, a number of rectifiers are connected in parallel, this display only appears if all diodes are open-circuited.



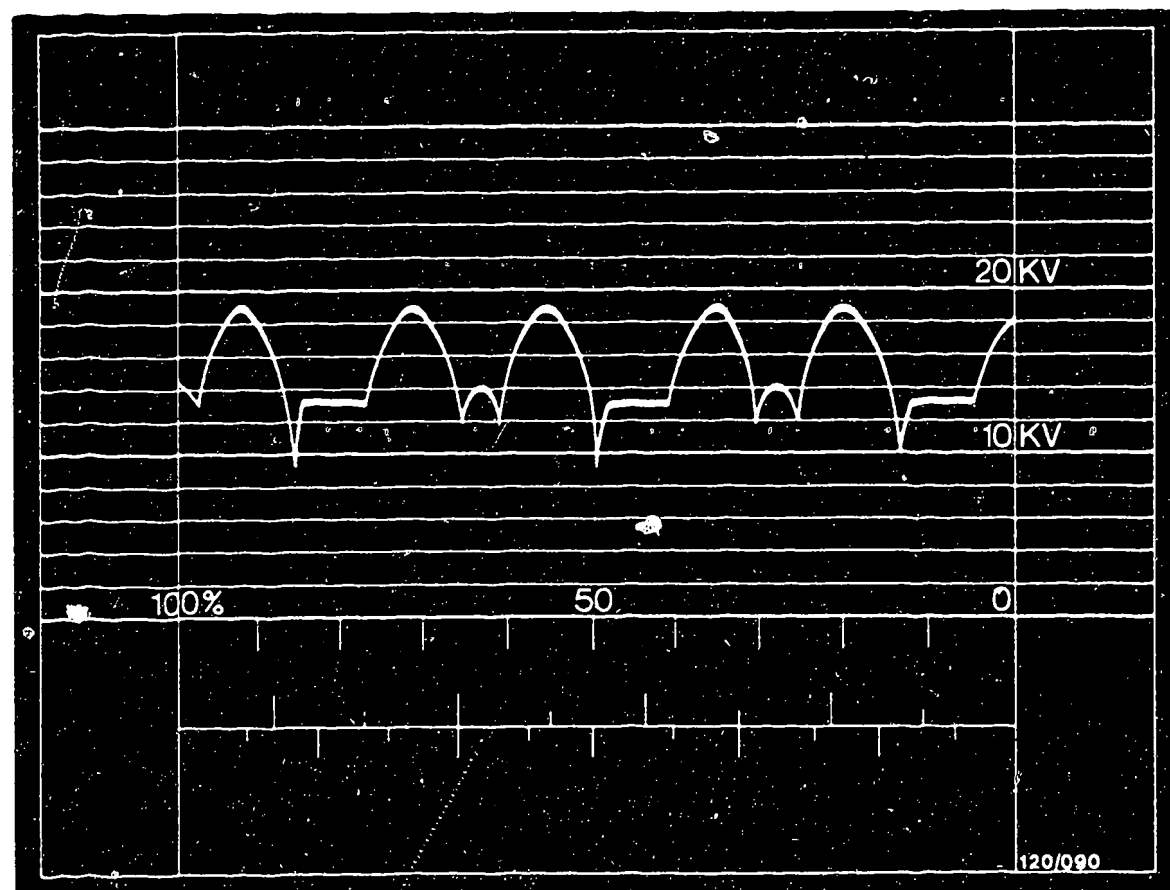
Oscilloscope display shows open circuit in a negative diode.

If, on the alternator, a number of rectifiers are connected in parallel, this display only appears if all diodes are open-circuited.

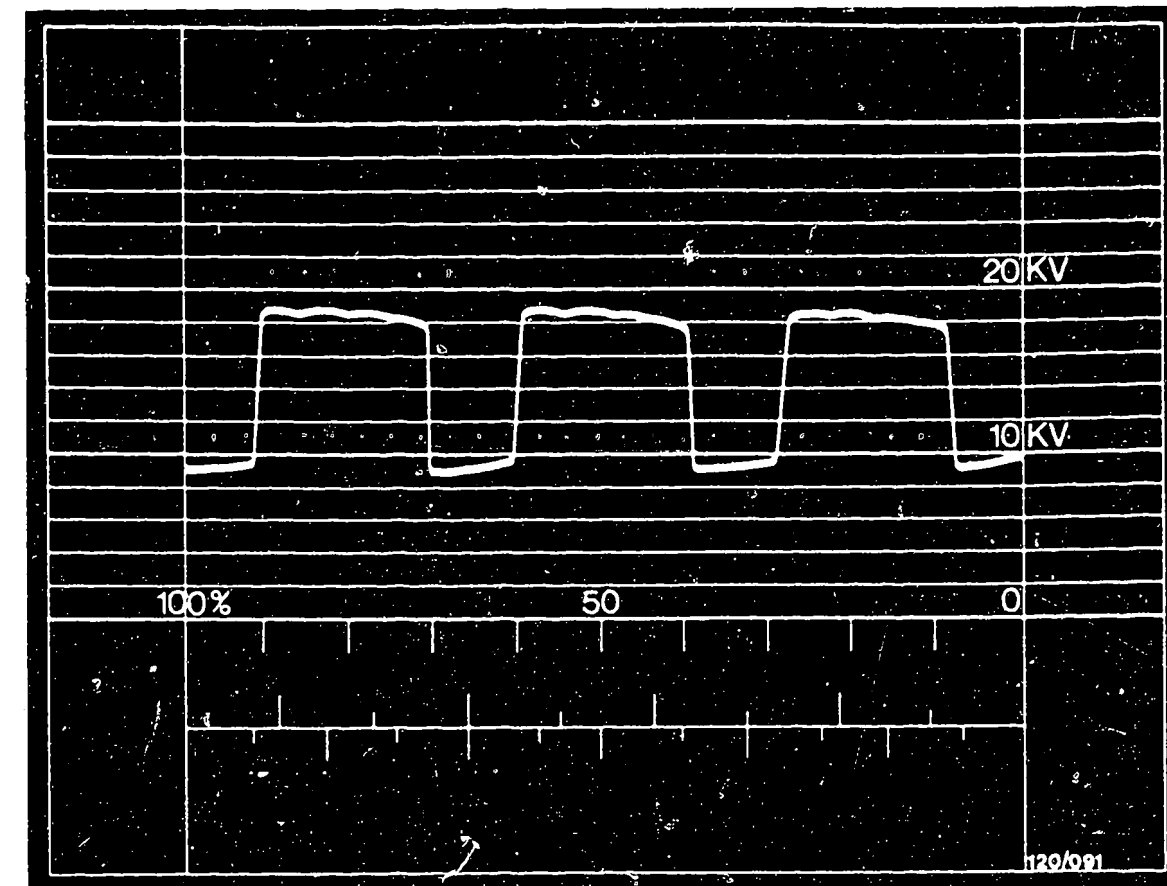


Oscilloscope display shows short circuit in an exciter diode.

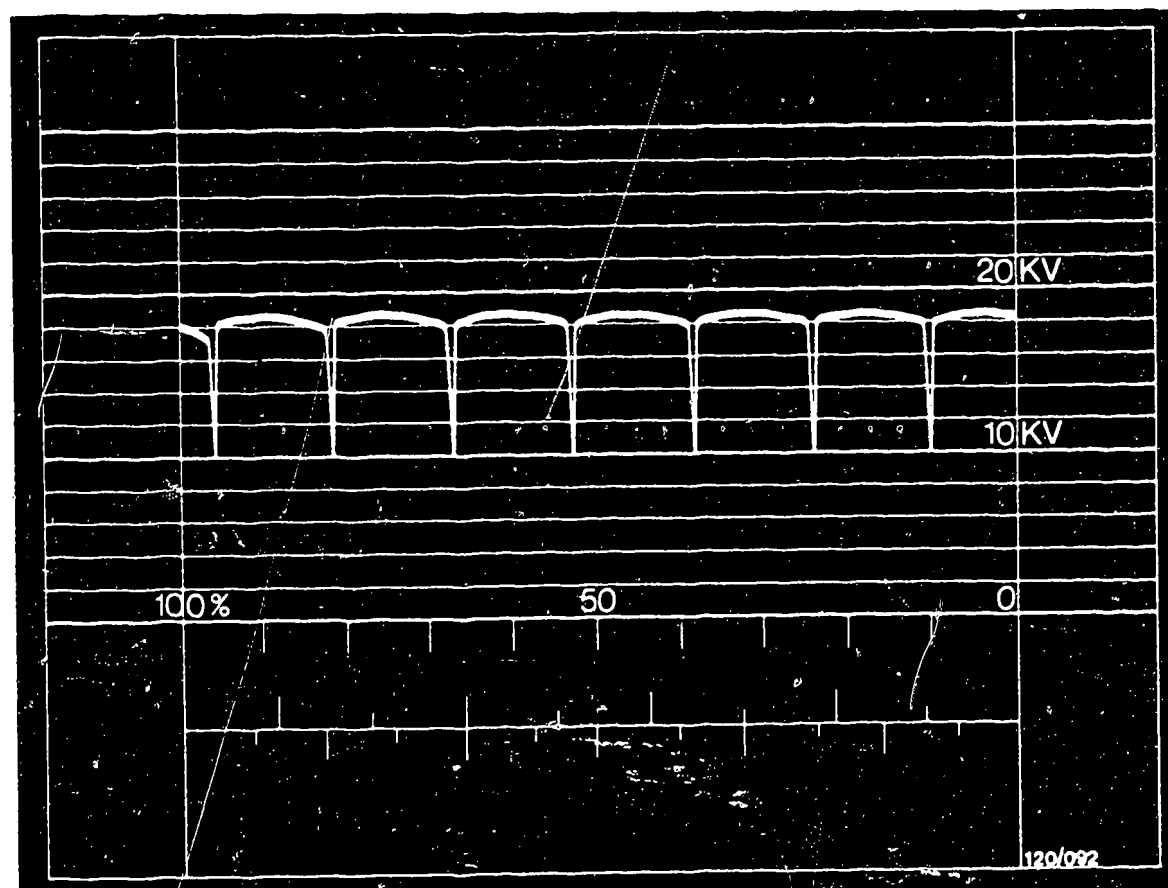




Oscilloscope display shows short circuit in one or more positive diodes.



Oscilloscope display shows short circuit in one or more negative diodes.



Oscilloscope display shows phase defect (open circuit)

For production reasons:  
continued on the following  
coordinate.

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